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# AUTHOR-EDITOR GUIDE
TO
# TECHNICAL PUBLICATIONS PREPARATION

by

GEORGE M. HORN

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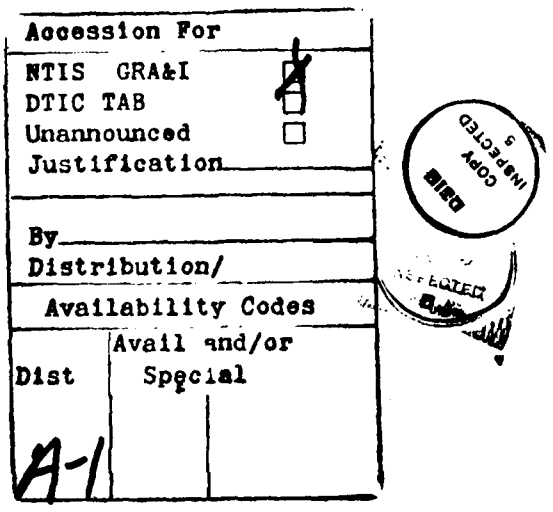
# PREFACE

An early version of this handbook was issued in March 1965, revised in July 1966, and reissued in January 1972 as USAFETAC Technical Note 72-1. Another version, "A Guide for Writing USAFETAC Reports," was issued in February 1973.

This version, published in September 1986 and revised in January 1990, gives Air Weather Service authors and editors consolidated guidelines for preparing technical publications that conform to Department of Defense standardization instructions. Distribution limitations and markings, as summarized and adapted from Air Force 80-series regulations, are described. The handbook urges authors and editors to concentrate on plain writing and offers hints for doing so. Basic rules for usage and punctuation are summarized and included. The January 1990 revision updates a number of references, reflects changes in limitation markings, and provides examples of the new Standard Form (SF) 298.

The author wishes to thank Mr Edwin Newman (*Strictly Speaking*, 1974, and *A Civil Tongue*, 1975) for providing the inspirational backup required to press the war against the "parameterization" of the English language.



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# Chapter 1

# INTRODUCTION

*The most immutable barrier in nature is between one man's thoughts and another's.*

--William James

**1.1 Why a Technical Publication?** The purpose of a technical publication is to transfer complicated scientific or technical data from author to reader with as little information loss as possible. To minimize that information loss, authors are obliged to present their material clearly and simply. And since technical publications are exchanged throughout the entire scientific and technical community, writers and editors are further obliged to make their work conform to a standard format.

**1.2 The Publication Process.** An AWS technical publication starts with an author and an idea. If the author wishes to share the idea, it's put into words, either on paper or in a computer. When the idea and the words that explain it have been approved at each step in the author's command chain, the manuscript goes to an editor, who assembles it and prepares it for publication. When the author, the editor, and all parties in the review and approval chain have agreed that this collective effort is their best, the idea is published and made available to others.

**1.3 Technical Writing Standards.** Most scientific and technical agencies, both public and private, have rules and guidelines for writing, editing, and publishing technical documents. The technical report preparation standard recognized and used by the Department of Defense (DoD) is the American National Standards Institute (ANSI) Standard Z39.18-1987, *Scientific and Technical Reports--Organization, Preparation, and Production.* The ANSI standard is observed by nearly all other U.S. government departments and agencies, as well as by most American businesses and professional organizations. Note that nearly all standards or conventions for technical writing (as well as for basic English usage) are designed for *reader convenience.* If a given device will make comprehension and understanding easier for the reader, it is either a standard already, or should be.

**1.4 Technical Document Protection.** Protection of scientific and technical documents is provided by the correct application of distribution limitations as directed by the DoD and promulgated by USAF. See Chapter 2.

**1.5 Handbook Organization.** This handbook draws on a number of references, as well as on the author's experience, to give AWS authors and editors the basic information they need to write, assemble, and publish technical documents. It does not presume to be an all-inclusive textbook on technical writing or editing, but assumes some basic skills on the part of the user.

***Chapter 2*** explains the Department of Defense distribution limitation system. It is intended to help authors and editors apply restrictions in a way that will properly protect their documents' contents from unfriendly exploitation.

***Chapter 3*** is for authors. It includes basic formats, instructions for organizing ideas and preparing drafts, and guidelines for document assembly--in short, how to put the document together before it goes to the editor.

***Chapter 4*** tells editors how to format a document and prepare it for printing. It includes a limited discussion of current word processing and electronic publishing procedures, but applies basically to any system that can produce a camera-ready printing master.

***Chapter 5*** provides, in dictionary format, a list of words and terms frequently used and abused by technical writers, along with abbreviated guides to numbers, punctuation, word compounding, and syllabication.

***The Bibliography*** provides a list of references that authors and editors of technical publications may find interesting and useful.

# Chapter 2

## DISTRIBUTION LIMITATIONS

*In recent years, the United States Government has learned of a massive, well-organized campaign by the Soviet Union to acquire Western technology illegally and legally for its weapons and military equipment projects. Each year Moscow receives thousands of pieces of Western equipment and many tens of thousands of unclassified, classified, and proprietary documents as part of this campaign. Virtually every Soviet military research project--well over 4,000 each year in the late 1970s and over 5,000 in the early 1980s--benefits from these technical documents and software.*

--1985 Department of Defense White Paper

**2.1 Why Limit Distribution?** The nature of the Defense Department's mission suggests that at least some of its unclassified scientific and technical material requires distribution controls. Without controls, all technical publications, without regard to content or sensitivity, would be readily available to everyone, everywhere. Granted, much of the scientific/technical material produced by the DoD and its agencies (AWS included) is such that unlimited exchange is indicated. In fact, AFR 83-1, *USAF Scientific and Technical Information Program*, encourages making certain Air Force-developed technology "available to state and local governments and private industry." There are, however, numerous exceptions. Although some technical material may not be classified in accordance with security directives, much is subject to other restrictions designed to restrict the flow of critical information from the United States to those individuals, agencies, or governments that should be denied access to that information for many reasons.

**2.2 Implementing Directives.** The distribution controls described here have been summarized from the following USAF 80- and 83-series directives and pamphlets that promulgate DoD directives.

***AFP 80-30**, Marking Documents with Export-Control and Distribution Limitation Statements*, 20 December 1985. Assists users in identifying export-controlled data; gives rationale for selecting appropriate distribution-limitation statements on newly created unclassified technical documents.

***AFR 80-34**, Withholding of Unclassified Data From Public Disclosure*, 5 December 1985. Describes policy and procedure for withholding data that may not be exported lawfully without approval, authorization, or license under current law. Implements DoD Directive 5230.25, 6 November 1984.

***AFR 80-45**, Distribution Statements on Technical Documents*, 23 September 1985. Establishes policies and procedures for marking technical documents to show that they are either releasable to the public or that their distribution is to be limited and controlled. Implements DoD Directive 5230.24, 20 November 1984.

***AFR 83-1**, USAF Scientific and Technical Information Program*, 1 December 1988. Describes the Air Force Scientific and Technical Information (STINFO) Program; tells how to manage STINFO resources. Implements DoD Directive 3200.12, 15 February 1983.

***AFR 83-2**, Air Force Technical Publications Program*, 15 June 1989. Gives rules for writing, processing, publishing, and distributing Air Force Technical Publications.

**2.3 Distribution Limitation Markings.** To limit access to its scientific and technical data, the Department of Defense has established a system for marking all its technical documents to indicate limitations on distribution. This chapter lists and explains those markings to provide guidance for choosing the correct limitation marking for any given technical document. Authors and approving authorities (i.e., whoever signs "for the commander" on the "Review and Approval" page) are jointly responsible for determining the correct marking, as well as for providing a specific *reason* for selecting that marking. These decisions should be made as early in the document's development as possible. When there are problems in making these kinds of decisions, contact your STINFO Program Manager. (Contact the AWS STINFO Program Manager at: AWS/DOZ, Scott AFB, IL 62225-5008). Figure 2-1 lists and describes the seven distribution statements now in use. *Reasons* for selecting a particular statement are listed in Para 2.4 and summarized in Figure 2-2.

**DISTRIBUTION "A"**

**Approved for public release; distribution is unlimited.**

If you select this statement, your document's distribution is, in fact, "unlimited." It can be obtained by any agency--public, private, or foreign--that wants it. After an "unlimited" document has been registered with the Defense Technical Information Center (DTIC), it is made available to the National Technical Information Service (NTIS), where it becomes accessible to the public. Never use statement "A" on classified documents or on those that require an "export-control" warning (see Para 2.5).

**DISTRIBUTION "B"**

**Distribution authorized to U.S. Government agencies only,** [enter *reason* (1-10) selected from Para 2.4], [date of determination]. **Other requests for this document shall be referred to** [controlling agency/office].

Statement "B" limits distribution to U.S. Government agencies, excluding government contractors.

**DISTRIBUTION "C"**

**Distribution authorized to U.S. Government agencies and their contractors,** [enter *reason* (1, 3, 7, 8, or 9) selected from Para 2.4], [date of determination]. **Other requests for this document shall be referred to** [controlling agency/office].

Statement "C" differs from "B" only in that it adds U.S. Government contractors.

**DISTRIBUTION "D"**

**Distribution authorized to the Department of Defense and DoD contractors only,** [enter *reason (1, 3, 7, 8, or 9)* from Para 2.4], [date of determination]. **Other requests shall be referred to** [controlling agency/office].

Note that "D" differs from "B" and "C" in that it limits distribution to DoD agencies and DoD contractors; selection of statement "D," then, would permit distribution to the Army or Navy, but deny it to NOAA or NASA.

**DISTRIBUTION "E"**

**Distribution authorized to DoD components only,** [enter *reason* (1-9) selected from Para 2.4], [date of determination]. **Other requests for this document shall be referred to** [controlling agency/office].

Statement "E" differs from "D" only in that it excludes DoD contractors.

**DISTRIBUTION "F"**

**Further dissemination only as directed by** [controlling agency/office, date of determination], **or higher DoD authority.**

Use statement "F" when the originator determines that the content is subject to special limitations specified by DoDD 5200.1-R, Paragraph 4-505. Normally used only on classified documents.

**DISTRIBUTION "X"**

**Distribution authorized to U.S. Government agencies and private individuals or enterprises eligible to obtain export-controlled technical data in accordance with regulations implementing 10 U.S.C. 140c,** [date of determination]. **Other requests must be referred to** [controlling agency/office].

Use statement "X" on unclassified documents that contain "export-controlled" technical data (see Paragraph 2.5) when statements "B" through "F" do not apply. Never use "X" on classified documents. A Statement "X" marking is always accompanied by the export-control warning described in Paragraph 2.5.

***Figure 2-1. Limited Distribution Statements A-X.***

**2.4 Distribution Statements.** The DoD has established seven distribution limitation statements for marking technical documents. These seven statements are in addition to the "export-control" limitation that will be discussed in Paragraph 2.5. Each of the seven limitation categories is identified by a letter code (A, B, C, D, E, F, or X) associated with one of seven matching distribution limitation statements shown in Figure 2-1. One of these statements must appear on the cover of every technical publication. Statements B, C, D, and E must also include a *reason* selected from the following list. A reason is *not* included with statements A, F, or X.

*1.* ***Foreign Government Information.*** To protect and limit distribution IAW the wishes of the foreign government that furnished technical information used in the document. Note that information of this type normally requires classification at the CONFIDENTIAL level or higher IAW DoD Directive 5230.9. An example would be a technical publication that contains data provided by a foreign government that has the expectation, expressed or implied, that the information, its source, or both, be held in confidence. *Use with statements B, C, D, and E.*

*2.* ***Proprietary Information.*** To protect information not owned by the U.S. Government and protected by a contractor's "limited rights" statement, or received with the understanding that the information not be distributed outside the U.S. Government. *Use with statements B and E.*

*3.* ***Critical Technology.*** To protect information that advances current technology, describes new technology in an area of significant or potentially significant military application, or relates to a potential adversary's specific military deficiency. *Use with statements B, C, D, and E.*

*4.* ***Test and Evaluation.*** To protect results of test and evaluation of commercial products or military hardware when such disclosure might result in unfair advantage or disadvantage to the manufacturer. *Use with statements B and E.*

*5.* ***Contractor Performance Evaluation.*** To protect information in management reviews, records of contract performance evaluation, or other advisory documents that evaluate contractors' programs. *Use with statements B and E.*

*6.* ***Premature Dissemination.*** To prevent premature release of information on systems or hardware still in development. *Use with statements B and E.*

*7.* ***Administrative or Operational Use.*** To protect valuable technical or operational information from automatic dissemination beyond the U.S. Government and its contractors; may be applied to any technical publication used strictly for official administrative or operational purposes. *Use with statements B, C, D, and E.*

*8.* ***Software Documentation.*** To protect information otherwise releasable only IAW DoD Instruction 7930.2, (reference (i)). *Use with statements B, C, D, and E.*

*9.* ***Specific Authority.*** To protect information not specifically covered by other reasons, but that still requires protection IAW documented authority. Cite the "documented authority"; i.e., the specific directive, letter, or document. *Use with statements B, C, D, and E.*

*10.* ***Direct Military Support.*** Use with statement E *only.*

REASON SELECTION MATRIX

| STATEMENT | REASONS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| B | * | * | * | * | * | * | * | * | * | |
| C | * | | * | | | | * | * | * | |
| D | * | | * | | | | * | * | * | |
| E | * | * | * | * | * | * | * | * | * | * |

***Figure 2-2. Summary Matrix for Selecting Reasons for Statements B, C, D, or E.***

**2.5 Export-Controlled Technical Data.** The rationale for applying an "export-control" limitation to a technical document is to keep "militarily critical" information out of the hands of potential adversaries, including the Warsaw Pact countries and their allies. Documents with an "export-control" marking can be legally denied (despite the Freedom of Information Act) to those not specifically licensed (by the Department of Commerce) to receive them. Quoting from AFR 80-34, an "export-control" marking should be placed on:

> "All newly created unclassified technical data with military or space application, which may not be exported lawfully without an approval, authorization, or license under current law or executive order. Technical data includes production, engineering, logistics, scientific, and technical information that can be used or adapted for use to design, engineer, produce, manufacture, operate, repair, overhaul, or reproduce any military or space equipment or technology concerning such equipment."

Identification of "export-controlled" technical data is not a simple matter, particularly for AWS writers who will, most of the time, address the *application* of a given technology rather than its creation or production. Precise use of export-control markings requires considerable experience, as well as access to certain lists and documents that are probably not maintained in your unit. To assist you, the following is a list of terms and documents used in the determination of "export-control" status. The list (and the checklist in Figure 2-3) may help make the "export-control" determination, but when in doubt, consult your STINFO Program Manager.

***Technical data*** Production, engineering, logistics, and scientific and technical information generated by Air Force organizations and their contractors; may be in the form of formal written reports, blueprints, drawings, plans, instructions, computer software and documentation, or other technical information that can be used or adapted to design, engineer, produce, manufacture, overhaul, or reproduce any military or space equipment or technology concerning such equipment.

***Technical document*** Any recorded technical information or data in any physical form (paper, microfiche, magnetic tape, computer disk or diskette, cassette, etc.). A technical publication is simply a published technical document; i.e., although all technical publications are technical documents, not all technical documents are technical publications.

***MCTL*** *The Militarily Critical Technologies List* (AD-A146998), October 1984. A detailed list of development, production, and use technologies that DoD has determined to be critical to given military capabilities and of significant value to potential adversaries.*

***ML*** *U.S. Munitions List.* A listing in the ITAR (at 22 CFR 121.01) that enumerates articles designated as arms, ammunition, and implements of war that are subject to export controls.*

***ITAR*** *International Traffic in Arms Regulations.* Prohibits export of technical data relating to arms, ammunition, and implements of war without approval of, and licensing by, the Department of State. Implements the Arms Control Act (AECA), 22 U.S.C. 2751-2794.*

***CCL*** *Commodity Control List.* A listing (prepared by the Department of Commerce in Export Administration Regulations at 15 CFR 399) of goods or technologies that may significantly contribute to the military potential of foreign countries, thereby adversely affecting U.S. national security. The export of items listed on the CCL requires licensing by the Department of Commerce.*

**Documents maintained by STINFO program managers.*

In addition to a distribution statement selected from Figure 2-1, add the following notice to any document that has been determined (as above) to contain export-controlled technical data.

**WARNING--This document contains technical data whose export is restricted by the Arms Export Control Act (Title 22, U.S.C., Sec 2751, *et seq*) or the Export Administration Act of 1979, as amended (Title 50, U.S.C App 2401, *et seq*). Violations of these export laws are subject to severe criminal penalties. Disseminate in accordance with the provisions of AFR 80-34.**

## CHECKLIST

### FOR IDENTIFYING EXPORT-CONTROLLED

### TECHNICAL DATA IN A TECHNICAL DOCUMENT

1. Can the data be used or adapted to be used to design, engineer, produce, manufacture, operate, repair, or reproduce some article?

   **NO** Not subject to export-control

   **YES** Go to question 2

2. Has identical data been previously released and made generally available?

   **YES** Not subject to export-control

   **NO** Go to question 3

3. Does the data give information recommended for control in the MCTL?

   **YES** If answer to 1 is also yes, it is subject to export-control

   **NO** Go to question 4

4. Does the data relate directly to weapons listed in Categories I-XVI of the ML, ITAR Section 22 CFR 121.01?

   **YES** If answer to 1 is also yes, it is subject to export-control

   **NO** Go to question 5

5. Does the data relate directly to an item listed on the CCL?

   **YES** If answer to 1 is also yes, it is subject to export control

   **NO** Not subject to export-control

***Figure 2-3. Export-Control Checklist.***

**2.6 Destruction Notices.** All unclassified documents with "B" through "X" (limited) distribution must also be marked (on the cover) with this destruction notice:

**DESTRUCTION NOTICE: Destroy by any method that will prevent disclosure of contents or reconstruction of the document.**

For classified documents, follow procedures in DoD 5200.22-M, Industrial Security Manual, Section II-19, or DoD 5200.1-R, Information Security Program Regulation, Chapter IX.

## A SUMMARY LISTING OF MARKINGS

### LIMITATION STATEMENTS

**A** Approved for public release; distribution is unlimited.

**B** Distribution authorized to U.S. Government agencies only, (reason), (date). Other requests for this document shall be referred to...

**C** Distribution authorized to U.S. Government agencies and their contractors, (reason), (date). Other requests for this document shall be referred to...

**D** Distribution authorized to the Department of Defense and DoD contractors only, (reason), (date). Other requests shall be referred to...

**E** Distribution authorized to DoD components only, (reason), (date). Other requests shall be referred to...

**F** Further dissemination only as directed by (agency), (date), or higher DoD authority.

**X** Distribution authorized to U.S. Government agencies and private individuals or enterprises eligible to obtain export-controlled technical data in accordance with regulations implementing 10 U.S.C. 140c, (date). Other requests must be referred to (controlling agency/office).

### EXPORT-CONTROLLED DATA

**WARNING**--This document contains technical data whose export is restricted by the Arms Export Control Act (Title 22, U.S.C., Sec 2751, *et seq*) or the Export Administration Act of 1979, as amended (Title 50, U.S.C App 2401, *et seq*). Violations of these export laws are subject to severe criminal penalties. Disseminate in accordance with the provisions of AFR 80-34.

### DESTRUCTION NOTICE*

**DESTRUCTION NOTICE**: Destroy by any method that will prevent disclosure of contents or reconstruction of the document.

* *Unclassified documents only*

***Figure 2-4. Summary List of Markings.***

# Chapter 3

## AUTHORS GUIDE

*In composing, as a general rule, run a pen through every other word you have written; you have no idea what vigor it will give your style.*

--Sidney Smith

**3.1 What to Write.** An author with an idea for a technical publication may wonder which direction to take, especially if this is a first effort. Air Weather Service technical publications come in several forms, depending on purpose, content, and intended readership. The types of technical publications with which this guide concerns itself are described below.

***Technical Report (TR).*** The technical report is the basic component of the DoD technical publications system, but in AWS, technical reports are only issued by HQ AWS. This is not to say that a TR cannot be *written* by anyone in AWS, so long as the proposal is forwarded through channels to AWS/XT and accepted for publication. AWS technical reports are intended to convey information of interest to the general AWS readership by documenting studies, projects, research efforts, and the like. If you think your idea meets the specifications and merits issuance as an AWS technical report, submit it through channels to AWS/XT. If accepted, your completed manuscript will be sent (through channels again) to USAFETAC's technical editor for publication.

***Technical Note (TN).*** USAFETAC started issuing "technical notes" in 1968, and AWS/DN followed suit about 10 years later. TNs are published in the same format as TRs, but were originally intended to cover narrower topic ranges and appeal to a more limited readership. Since all AWS technical publications are widely advertised among AWS units, however, history (and AWS-wide demand for many TNs) has shown that the only real difference between a TR and a TN is that the latter may be issued by HQ AWS, USAFETAC, or any AWS wing, while the "TR" designation is reserved to HQ AWS. Authors may submit ideas for technical notes to their parent wings for wing publication, or may apply through channels to AWS/XT for possible publication as an AWS or USAFETAC technical note.

***Project Report (PR).*** Project reports are published by AFGWC, the 2d Weather Squadron, or USAFETAC, normally to document work done on a specific project. PRs are in exactly the same format as TRs and TNs. Again, history has shown very little difference between the PR, the TR, and the TN. As a general rule, however, project reports are generally prepared with a single agency in mind (usually to document a response to a specific request), with publication as an afterthought for the benefit of other users who may be interested.

***Data Summary (DS).*** Data summaries are prepared and published by USAFETAC in basic technical publication format. Each DS, however, has its own unique internal format rules, and many, because they contain material subject to update, are aperiodically superseded, revised, or changed. Examples include Station Climatic Summaries, AWS Situation Climatic Briefs, and Surface Observation Climatic Summaries (SOCS).

***Forecaster Memo (FM).*** Strictly speaking, forecaster memos are not "technical publications," at least as far as the DoD is concerned. FMs are not prepared IAW the ANSI standard mentioned in 1.3, and they are not registered with the Defense Technical Information Center (DTIC). As a result, they are not made available to other DoD agencies. Although FMs do not require a Standard Form 298 or a review and approval statement, they <u>are</u> subject to the distribution limitations discussed in Chapter 2. The FM was originally intended to fill the gap left by the demise of the AWS Aerospace Sciences Review (a periodical) in 1979. It was conceived as a simple, informal way to disseminate topical articles on forecasting as they became available. Although now cataloged for reference (largely because most now contain information of lasting significance), FMs were not originally intended to be "permanent" documents. FMs are issued by AWS or by any AWS wing. Formats are up to the issuing agency. If you are considering an FM, we recommend you consider two questions: (1) Does this document have lasting significance?, and (2) Should it be shared with agencies outside AWS, such as the Army and Navy? If the answer to either question is "yes," the FM is not the proper way to go.

Let's assume, then, that you've picked the technical report, the technical note, or the project report. All three follow the same general format, and this handbook will address their preparation in some detail. If you have chosen the forecaster memo, this guide may still help--but since FM formats are left to the individual needs of the originating agency, authors should consult local policy.

**3.2 Getting Started.** If you're already thinking about writing a technical publication, you probably have at least some idea of what you want to say. When you've organized that idea (either in your head or on paper), a logical first step would be to secure support for the project from whomever it is in your management chain that will eventually approve your work for publication. In short, run the rough idea through channels and get approval to continue working to whatever level of publication you think appropriate. For a wing technical note, that path would lead through channels to the wing DN; for an AWS technical report or technical note, to AWS/XT; and for a USAFETAC technical note, to USAFETAC/DO and/or the Chief Scientist.

**3.3 Request a Subject Bibliography.** It would be a smart move, at this point, to request a "subject bibliography" on your topic from the AWS Technical Library. Such a bibliography will serve you in several ways. By showing the extent of other work on your subject, it will help you avoid duplication. If the literature shows an information void, you may be further encouraged to fill it. At the very least, a bibliography can provide a rich source of reference material. You may call the AWSTL's Document Research section (USAFETAC/LDX--AV576-5023) to discuss your research needs at any time.

**3.4 After Approval.** When you get a green light from the approval authority, you're ready to get serious. For the time being, let's set format considerations aside and concentrate on content; that is, "The Words." For now, don't concern yourself with details like spelling, the proper number of line feeds, or whether "word processing" is one word, two words, or hyphenated. Bake the cake first--the frosting goes on last.

**3.5 The Outline.** Start organizing your thoughts in simple and logical outline form. For now, feel free to organize and paragraph as you would in normal correspondence. "Simple" is good, but the "logical" part is vital. If you can't *think* clearly, you can't *write* clearly. Unfortunately, clear thought does not always prevail, and the result is confusion, frustration, and waste. Logical organization is doubly important if you plan on leading your reader to one or more conclusions. Don't hide conclusions in the middle of the report. Explain them, support them, and emphasize them at the finish. They are not, after all, called "conclusions" for nothing.

**3.6 Try Patterning.** An old outlining technique that goes by many names is referred to by most as "patterning." It can be used to make a complicated subject simpler, or to help in the writing process. In patterning, one writes the central idea in the middle of the paper as a nucleus. Then you add other ideas and information more or less where they belong in a loose orbit around the nucleus. The main idea is that the whole "pattern" fit on one piece of paper, one blackboard, or one bus station wall--the whole thing has to be visible at once, as a "pattern." Figure 3-1 is an example of a patterning exercise.

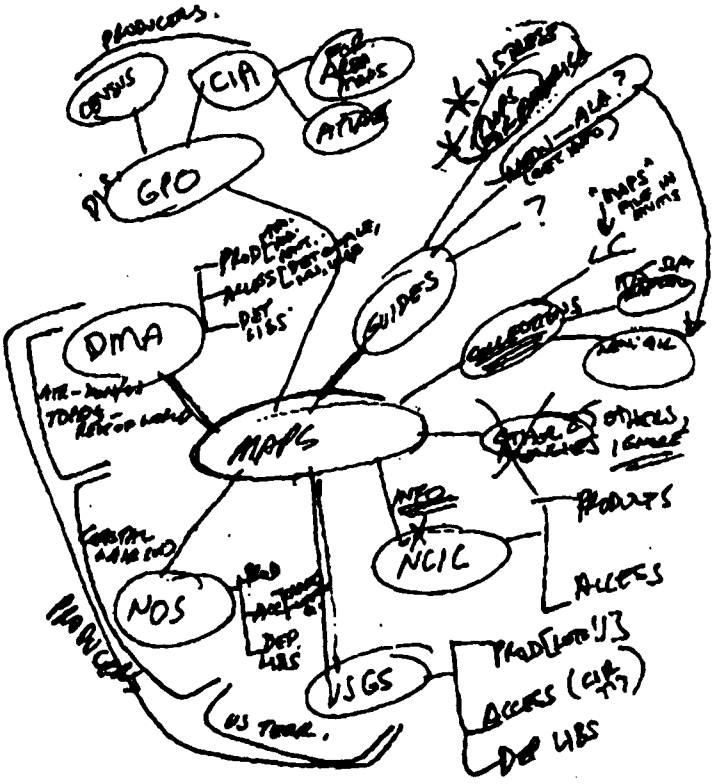



***Figure 3-1. Example of a Patterning Exercise (Blados, 1989).***

**3.7 The Rough Draft.** However you create your outline, use it to write a rough draft. By "rough," we mean one that manages to get the basic idea down on paper (or on a CRT). There'll be time to refine it later. Check out the organization again to be sure the material is logically arranged (cause produces effect, if "A" then "B," Tuesday follows Monday--that sort of thing). The body of your text might logically include the following points, generally in this order: an introduction; methods, assumptions, and procedures; results and discussion; and conclusions. These are only suggestions; use whatever form provides the most logical exposition of your ideas.

**3.8 Graphics.** If there will be graphics (figures, tables, etc.), rough in their approximate locations in text. Try to put graphics as close as possible to that part of the text that mentions them, usually following that mention. And always mention them! Examine the need for appendices to handle lengthy series of tables, figures, or charts. See Chapter 4 for more detail.

**3.9 Equations.** If there are equations, insert them where they belong in text, and number them. In the final publication, equations are centered, separated from preceding and following text by at least one line, and numbered consecutively (enclosed in parentheses, in the right-hand margin) throughout the text. For example:

$$\tau_2 = exp\left[\left(\frac{R_2}{R_1}\right) ln\ \tau_1\right] \qquad (25)$$

In equations, as in all mathematical or statistical expressions--especially those with Greek, scientific, or mathematics symbols--there is a strong possibility for author-editor misunderstanding. Many symbols are easily mistaken for letters, and vice-versa. A casually handwritten expression can be (and frequently is) mistaken for something completely different. Take great care that draft equations and expressions are clearly drawn or typed. If necessary, make marginal notes that clearly identify symbol-letter "look-alikes." Note that "Rho," for example, looks like "p," "Tau" looks like "t," and omicron *is* "o." Since mistaken symbology will make a major difference in the outcome of the equation, be sure you make the distinctions clear. Be especially careful with subscripts and superscripts.

Figure 3-2 shows upper and lower cases of the Greek alphabet commonly used in scientific and technical notation. Rules and conventions for placing equations in text are discussed in considerable detail in Chapter 4.

| | | | |
|---|---|---|---|
| Alpha | A α | Nu | N ν |
| Beta | B β | Xi | Ξ ξ |
| Gamma | Γ γ | Omicron | O ο |
| Delta | Δ δ | Pi | Π π |
| Epsilon | E ε | Rho | P ρ |
| Zeta | Z ζ | Sigma | Σ σ ς |
| Eta | H η | Tau | T τ |
| Theta | Θ θ | Upsilon | Y υ |
| Iota | I ι | Phi | Φ φ |
| Kappa | K κ | Chi | X χ |
| Lambda | Λ λ | Psi | Ψ ψ |
| Mu | M μ | Omega | Ω ω |

***Figure 3-2. The Greek Alphabet.***

**3.10 Read and Rewrite.** Now read and rewrite your draft. Have others read it. Don't stop with the first, second, or even the third try. Few professional authors are easy enough on themselves to let early efforts go final. Ernest Hemingway told George Plimpton that he had rewritten the last page of "A Farewell to Arms" 39 times. When Plimpton asked what the trouble was, Hemingway said, "Getting the words right."

"Getting the words right" should be a writer's biggest concern. A technical writer's goals should also include "keeping the words simple." Technical writing needn't be pompous, pretentious, nor incredibly complicated. As a matter of fact, there is no magical technique that sets "technical writing" apart from any other kind of writing. There are really only two kinds of writing: good and bad. To produce the former, purge your work of jargon, tiresome repetition, and gobbledegook. Ask yourself how Harry Truman or Edwin Newman might have put it and do likewise. An inflated writing style characterized by endless "parameters" and "ramifications" impresses few, disgusts many, and confuses all. It is bad writing.

Note that the mere *size* of a word does not necessarily place it outside the boundaries of plain writing. Show us, for example, a 5-year-old child who does not recognize the four-syllable word "television," and we'll show you a child who has been raised by wolves. But the careful writer will almost always choose the shorter word or words that mean the same thing. To illustrate, there is no known case in which the simple "use" cannot be substituted for "utilize." And "about" does the same job as "approximately," but better.

The size of a *sentence*, on the other hand, can be a problem. Long and rambling sentences give readers headaches. A fair rule of thumb is a maximum of 30 words per sentence. If you're averaging more than that, you're probably boring. Another test for length: If even you (the author) lose touch with the first part of a sentence while reading the last, it's too long. Fix it.

And when you think you've finished, start slashing your draft. That business about "running a pen through every other word" is not as frivolous as it sounds. There is very little scientific or technical writing that cannot be improved by ruthless pruning.

**3.11 Now for the Format.** When you've finished wrestling with the words, it's time to consider format. The DoD and Air Force ask only that technical publications follow the basic ANSI format mentioned earlier. The ANSI format offers enough latitude for application to all scientific disciplines while providing just enough standardization to facilitate electronic document exchange. As we mentioned before, organizing your material in the same way as normal correspondence is OK. You may use the same chapter or section breakdowns you see here, or you can adapt them in a way that better suits your own application. Technical publications are normally arranged by chapters, parts, or sections, depending on the material. You may use decimal numbering for paragraphs (as you see here), or you may choose not to use numbering at all. Just be sure you emphasize headings and subheadings properly. Subordination of ideas is very important. In short, text organization should suit the material presented and is an author/editor call.

**3.12 Assembling the Components.** Although organizing and assembling the components of your publication is basically an editorial job, authors should have at least some idea of what's required. They must also be prepared to contribute certain information the editor will need. The basic parts of a typical AWS technical publication, in proper order of assembly, are listed in Figure 3-3. The cover, review and approval statement, SF Form 298 (Report Documentation Page), and distribution list are the only components that *must* accompany the basic text (the body of the report), at least according to DoD rules. Other parts may or may not be included (most usually are), but that is best determined in coordination between author and editor.

◊ COVER

◊ REVIEW AND APPROVAL STATEMENT (3.14.2)

◊ SF FORM 298 or word processor equivalent (3.14.1)

◊ PREFACE (3.15.2)

◊ TABLE OF CONTENTS (3.15.3)

◊ LIST OF FIGURES AND TABLES (3.15.3)

◊ LIST OF SYMBOLS, ACRONYMS, INITIALISMS, AND ABBREVIATIONS (3.15.8)

◊ BODY OF REPORT (Chapter 1, Chapter 2, etc.)

◊ APPENDIX OR APPENDICES (3.15.6)

◊ REFERENCES (3.15.5)

◊ BIBLIOGRAPHY (3.15.5)

◊ DEFINITIONS OR GLOSSARY (3.15.7)

◊ INDEX (3.15.9)

◊ DISTRIBUTION LIST (3.14.3)

***Figure 3-3. Components of the Complete Technical Publication, in Preferred Order of Assembly, with references indicated.***

**3.13 Manuscript Submission.** When your draft manuscript is ready to go (that is, when you're reasonably happy with the text, it's roughly assembled, and it has management approval), you may submit it to the editor. The ways in which draft manuscripts are submitted vary depending on the word processing system in use. If your unit is only capable of a typewritten draft, it should be double-spaced unless arrangements have been made to run it through USAFETAC's scanner, a device that "reads" text into the word processing system. If word processing is available, every effort should be made to provide or arrange for electronic transfer to the editor's word processor.

**3.14 Material That Should Accompany Draft Manuscripts.** To save time, authors should provide the following pieces of documentation and information with draft manuscripts:

**3.14.1 Standard Form (SF) Form 298.** Figure 3-4 (next page) is the latest version of Standard Form (SF) 298, "Report Documentation Page." This page is prepared for publication by the editor and printed with the document, either as a form or its word processor equivalent. Instructions for most of the blocks on the form follow, but only the information in the shaded blocks (Figure 3-4) is required for initial document assembly.

SF 298 INSTRUCTIONS

***Block 2. Report Date.*** Month and year of publication.

***Block 3. Report Type and Dates Covered.*** Discuss with the editor.

***Block 4. Title.*** Brevity and clarity count. Titles should not exceed 10 words. Avoid ambiguous terms (like "A Study of...," "Operational Use of...," or "A Method for..."). Instead of "Theoretical Considerations Concerning the Application of Gravimetric Data to Missile Trajectories and Resultant Effects on the CEP," try "Gravity Data for Missile Trajectories." It may help if you remember that people looking for your document normally do so by subject. By describing it simply and clearly, you'll increase their chances for success.

***Block 6. Author(s).*** Full names and (for military) grades. Include unit of present assignment if author is no longer assigned to the unit publishing the report.

***Block 7. Performing Organization name and address.*** Enter the unit publishing the document.

***Block 11. Supplementary Notes.*** Include revision or supersession information.

***Block 12a. Distribution/Availability Statement.*** Enter a distribution code letter ("A" through "X") selected from Chapter 2. If "B" through "X" is selected, enter a brief explanation for that choice.

***Block 13. Abstract.*** Volumes have been written on the fine art of abstracting, with good reason: it's one of the toughest jobs in the business of writing. Given an infinite number of pencils and an infinite supply of paper, almost anyone can describe anything. It takes skill and practice to do the job in 200 words or less. An abstract is simply a concise synopsis that should tell prospective readers of your document enough to decide whether or not they need it. Abstracts are vital to the information retrieval process. Since certain conventions apply, mainly to assure compatibility with computer search procedures, your editor will provide the final version.

***Block 14. Subject Terms.*** These are used for indexing and cataloging when the document is entered in the Defense Technical Information Center (DTIC) computer database. These terms, listed in rank order of importance, are of vital importance to information retrieval specialists as they perform computer searches of the DTIC database. The editor will finalize your efforts, but you can help by providing a list of the most important terms that you think best describe the content of your document and that might logically lead a researcher to it.

***Block 15. Number of Pages.*** Usually the last entry before publication.

***Block 17. Security Classification of Report.*** Normally "Unclassified." If not, discuss it with the editor before going any further.

***Block 18. Security Classification of this Page.*** Normally "Unclassified."

***Block 19. Security Classification of Abstract.*** Normally "Unclassified."

**3.14.2 Draft Review and Approval (R & A) Statement.** A mandatory part of every AWS technical publication. Prescribed by AFR 83-1, the R & A statement is prepared and published as a separate page (page iii) in the final document. Authors will have provided the information necessary to prepare this page by completing Block 12a, SF Form 298. Formats for AWS R & A statements are given in Chapter 4.

## REPORT DOCUMENTATION PAGE

*Form Approved*
*OMB No. 0704-0188*

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

| 1. AGENCY USE ONLY *(Leave blank)* | 2. REPORT DATE | 3. REPORT TYPE AND DATES COVERED |
|---|---|---|

| 4. TITLE AND SUBTITLE | 5. FUNDING NUMBERS |
|---|---|
| 6. AUTHOR(S) | |
| 7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) | 8. PERFORMING ORGANIZATION REPORT NUMBER |
| 9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) | 10. SPONSORING / MONITORING AGENCY REPORT NUMBER |
| 11. SUPPLEMENTARY NOTES | |
| 12a. DISTRIBUTION / AVAILABILITY STATEMENT | 12b. DISTRIBUTION CODE |
| 13. ABSTRACT *(Maximum 200 words)* | |

| 14. SUBJECT TERMS | | | 15. NUMBER OF PAGES |
|---|---|---|---|
| | | | 16. PRICE CODE |
| 17. SECURITY CLASSIFICATION OF REPORT | 18. SECURITY CLASSIFICATION OF THIS PAGE | 19. SECURITY CLASSIFICATION OF ABSTRACT | 20. LIMITATION OF ABSTRACT |

NSN 7540-01-280-5500

Standard Form 298 (Rev 2-89)
Prescribed by ANSI Std 239-18
298-102

***Figure 3-4. Standard Form (SF) 298, "Report Documentation Page."*** Authors should complete the shaded blocks before submission of the manuscript package.

**3.14.3 Distribution List.** An initial distribution list is printed as the last page(s) of every technical publication. The author or OPR should provide a detailed list of special recipients, with complete addresses (including plus-4 zip codes) and the number of copies intended for each. This list will normally be incorporated into another list prepared by the editor to include "standard" addressees such as the AWS wings, the Air University Library, and the Defense Technical Information Center (DTIC).

**3.15 Other Ingredients.** In addition to the basic draft text (the narrative), the SF Form 298, the review and approval statement, and a distribution list, authors may include any of the following, as appropriate.

**3.15.1 Graphics.** If you plan to include graphics (figures, tables, illustrations, photos, etc.), you should discuss them with the editor early in the project, primarily to determine how and by whom they will be prepared. Completed graphics take time, particularly complex graphs and charts. The following tips may make things easier.

- Work with the editor to determine the best way to prepare and insert graphics. Be sure your manuscript clearly indicates rough graphics placement. Normally, figures and tables are inserted to follow, as closely as possible, their first mention in text.

- If you plan to submit computer graphics, do not use color. Color reproduction is expensive, and it requires special justification, seldom given. Rather than colored lines or bars, use contrasting light or dark solids, dashes, or dots.

- Avoid "busy" graphics; i.e., those that try to give too much information all at once. If it takes more than one chart or graph to do the job, use them. If you're using maps, you'll find that good black and white base maps (especially those that show topographic features) are hard to find. In most cases, a full-color map has to be halftoned before it can be used in black and white reproduction (halftoning reduces solid images to tiny dots that can be reproduced in black and white). Even with halftoning, results are not always good. The color blue (a popular map color) does not reproduce. Maps take time and planning. Start your map search early.

- Make sure your maps are consistent with, and relate to, your text; that is, if the text references a geographic feature, it should be noted on the map, and vice-versa. Compare maps and text carefully!

- When planning graphics, consider proportion. Technical documents are printed on 8 1/2 X 11" paper, usually with at least a 3/4-inch margin. A square chart, no matter how it is reduced or enlarged, does not fit well into an oblong full-page format. In graphics insertion, size is not a problem, but proportion is.

- Avoid "foldouts"; that is, oversize pages that must be folded to fit a standard 8 1/2 X 11" publication.

- Provide the editor with a caption for each figure, table, chart, or illustration. Captions should describe the graphic concisely, and should not replace or echo the text. Be brief. Since there are definite DoD conventions for labeling graphics (see Chapter 4), finishing touches are best left to the editor.

- Number your figures, tables, charts, maps, etc., clearly. In a short document, a "1, 2, 3" system will do. In a larger document with multiple chapters or sections, you may wish to use the chapter, section, or appendix number; e.g., "1-1, 1-2, A-1." When the number sequence is complete, provide the editor a numbered list of all proposed graphics, with suggested captions.

- If any of the material you plan to use is a computer printout, be sure you provide the first carbon for use as a printing master. Originals are too light for good reproduction. A recent development allows for "compression" of computer data to an 8 1/2 X 11 inch format, and results in a lot less trouble trying to produce camera-ready copy from oversize computer paper.

**3.15.2 Preface.** Although standards treat the preface as "optional," most AWS technical publications include one, and probably should. The preface is printed as a separate page on which the author explains why the report was prepared and for whom, describes any technical limitations that may apply to the data, and gives information on related work(s). Recommendations and conclusions may be summarized here, if applicable. The preface may also be used to acknowledge significant contributions to the total work. If copyrighted material is used, give credit in the preface; see Chapter 4.

**3.15.3 Table of Contents.** A "Contents" page is optional, depending on the size and complexity of the document. Its preparation is primarily an editorial function best left until final manuscript assembly to ensure an exact match with the contents. Many authors, however, prefer to prepare a table of contents of their own to better organize their material. In the final

manuscript version, separate lists of figures and tables will follow the table of contents, on a separate page.

**3.15.4 Footnotes.** As a general rule, avoid footnotes by including references in the text--your readers will appreciate it. Short reference citations in text are added like this: (Morris, 1984). If you cite two works in the same year, it's: (Morris, 1984a) and (Morris, 1984b). You may wish to add page numbers, like this: (Morris, 1984:235-236). Footnotes (when necessary) may be included as comments or explanations of the text, or as direct references to quoted material in text. Indicate footnotes with superscripted numbers (1) immediately following the material to be referenced, and add the footnote (with the corresponding number) at the bottom of the page. An alternate method is to key the reference to text with a superscripted numeral as above, but to include a list of such references at the end of the report rather than as footnotes on the bottom of each page, under a short line (see 3.11.5). Footnotes look like this:

---

[1]Christopher E. Strauss, "Search! Extending the Intelligence Preparation of the Battlefield," *Field Artillery Journal*, January-February 1983, pp. 50-53.

[2]Ibid.

[3]John F. Fuller, *Weather and War*, historical paper, MAC/HO, Scott AFB, IL, 1974.

**3.15.5 List of References and/or Bibliography.** Strictly speaking, a "references" list includes consecutively numbered materials that make specific reference to specific portions of your text. Materials in such a list would have been indicated by a corresponding superscripted numeral following the text to which the material applies. The procedure is similar to footnoting (3.12.4), except that what would have been "footnotes" appear as a numbered list following the text.

A bibliography, on the other hand, is a simple and general list of reference materials used in preparing your report. A bibliography may also include materials not directly used in report preparation, but that may be of interest to the reader (The bibliography included with this guide is such a list). You may include either a "list of references" or a "bibliography," or both. The well-researched document includes at least a bibliography. A *very* well researched document includes "references," as well. Examples of "references" and "bibliography" entries follow. The underlining in the first example is the typewritten equivalent of italics. Although several authorities may call for abbreviating certain bibliography entries (such as journal titles), we recommend you do not.

**BOOKS:**

Andersen, Victor, and Lawrence W. Smarrt, Methods in Modern Climatology, Harvard University Press, Cambridge, MA, 1950.

*Readings in Science and Engineering*, Holt, Rinehart and Winston, Inc., New York, 1961.

**DIRECTIVE:**

*Military Climatology for Armor*, AF Regulation 105-99, Washington, DC, 1984.

**TECHNICAL PUBLICATIONS:**

*A Climatologist's Guide to Random Analysis*, USAFETAC/TN-86/003, USAF Environmental Technical Applications Center, Scott AFB, IL, June 1976.

Hall, Peter J., *Weather and Climate of Central Africa*, AWS/TR-86/007, HQ Air Weather Service, Scott AFB, IL, March 1986.

Taylor, F.J., *Advanced Wavefront Technique*, AFWL-TR-85-103, Air Force Weapons Laboratory, Kirtland AFB, NM, December 1985.

**PERIODICAL (MAGAZINE, JOURNAL) ARTICLES:**

Finsen, Peter, et al., "Climate and Architecture: The TVA Climatic Data Base," *Journal of Applied Meteorology*, vol 20, pp. 1450-58, December 1981.

Benson, Fred W., and G.L. Martin, "Polar Outbreaks and the Jet Stream," *Modern Weather*, pp. 12-16, March 1986.

**UNPUBLISHED PAPER/DISSERTATION:**

Baum, C.E., *Electromagnetic Topology*, paper presented at 24th Midwest Symposium on Circuits and Systems, Albuquerque, NM, June 1981.

**3.15.6 Appendices.** An appendix is a logical way to handle large groupings of tables, charts, or figures that will not fit conveniently in the text. In multiples, appendices are labeled "Appendix A," "Appendix B," and so on. If there's only one, label it simply, "Appendix." Figures, charts, tables, equations, etc., in appendices are designated as A-1, B-3, D-7, etc., based on the appendix in which they appear.

**3.15.7 Definitions (glossary).** You should have defined all strange and unusual terms the first time they were used in the text. But if the list of those terms is very long, you would do well to include a complete alphabetical listing, with definitions.

**3.15.8 Symbols, Acronyms, Initialisms, and Abbreviations.** You may include a separate alphabetical listing of symbols and acrinabs, or you may choose to incorporate them in the definitions list mentioned above. In either case, they should all have been identified and explained in the text.

**3.15.9 Index.** Indices are seldom included in short technical publications, but they can be a real service to readers of more complicated documents that invite frequent reference. Preparing a good index is not easy, and we recommend you discuss such a project with the editor before attempting one.

**3.16 Wake Me When It's Over.** Let's say you've turned in your draft manuscript and all the bits and pieces that go with it. You're understandably relieved. But don't go away just yet, because you aren't finished. To paraphrase that great wordsmith Yogi Berra, "It ain't over til it's printed." Before going on that extended leave you feel you owe yourself, plan to spend time with the editor in working out details. Be prepared to review multiple editorial cuts at your work, and try to have patience with questions and changes. When editors change the words (and they will), it could be because they didn't understand what you were trying to say. And if the editor doesn't understand, chances are the rest of your readership won't, either. As a team, you and the editor can shine and polish your document to make it the best it can be. Cooperation is important to the publication process, which is only complete when the document rolls from the presses with everyone involved in its creation satisfied with the result.

**3.17 Errata.** Despite the best efforts of authors, editors, and proofreaders, mistakes do happen, especially in complicated technical documents. If there are errors, and if they are serious enough to affect the value of the document, they can be corrected through the issuance of an "errata" sheet that is sent to all the original addressees and attached to stock copies. When you become aware of such a mistake, tell the editor as soon as possible. Identify the error(s) and provide the correct entry or entries so that an errata sheet can be prepared and distributed as quickly as possible.

# Chapter 4

## EDITORS GUIDE

*Why shouldn't we quarrel about a word? What is the good of words if they aren't important enough to quarrel over? Why do we choose one word more than another if there isn't any difference between them?*

--G.K. Chesterton

**4.1 The Technical Editor's Job.** It has been said, with considerable truth, that editors are paid to make authors look good. Technical editors, in particular, are *obliged* to do so, primarily because their output goes well beyond instruction, entertainment, or uplift. Technical documents must be professional works that convey the author's original thoughts to the reader clearly and succinctly. In order to make sure they do that, editors must necessarily do some editing. And since editors are paid to be more than proofreaders, that means *real* editing--the kind that requires considerable knowledge of the subject material, the language, and the publishing business.

Most busy technicians and scientists have had neither the time nor the inclination to become professional technical writers. But because those worthy of their calling naturally have a strong sense of what is generally known as "pride of authorship," editors should be at least as strong in tact and sensitivity as they are with the letters. Work closely with your authors. Explain what you're doing to the manuscript, and why. But always remember that you are the professional here. Someone hired or appointed you as an editor for essentially the same reasons they would hire *any* professional--that is, you are assumed to know more about writing and editing than they do. But just as it takes more than a big watch to be a pilot, it takes more than a blue pencil to be an editor. If you have the skills to back up your blue pencil, use them. Don't be intimidated by amateurs.

**4.2. Assembling the Tools.** As with any craft, your product is no better than your equipment. And as has already been mentioned, tangible tools like blue pencils do not an editor make. Most of the required tools are mental, and you are assumed to have brought them to the job with you. Technical editing requires considerable technical *writing* skill. If you can't fly an airplane, you can't offer flying lessons, and if you can't write, you can't edit. In addition to mental capability, however, there is a sort of editorial tool box, and a partial list of the equipment you may want to keep in it follows.

**4.2.1 References.** Unless you have better recall than most, you can't possibly remember the thousands of rules (and suggestions) for format and usage. Collect enough reference materials to do your job. Keep them close, and keep collecting. A "must" is ANSI Z39.18 or its current equivalent. You should have all the USAF and AWS STINFO directives. Since you're a part of the process that leads to a correct distribution limitation statement on every document you produce, you should definitely have copies of all the 80- and 83-series USAF directives mentioned in Chapter 2. Other ANSI standards (such as the one for abstracting) can be helpful. At least one good dictionary (preferably unabridged) is indicated. Get a new one from time to time--the language changes with use. Because of the nature of the material you're dealing with, a few "special interest" dictionaries (geography, mathematics, data automation) might help. Keep at least a few current works on technical writing and basic English usage handy. If you read more than several of these, you'll note differences as well as similarities--precisely why you should stock (and consult) several. The bibliography included with this tech note covers a wide range of scientific/technical writing and editing reference needs. We suggest you examine it against your own requirements.

**4.2.2 Production Equipment.** You can prepare your "camera ready" printing masters on virtually anything reproducible. The typewriter represents the blunt edge of the technology, with the word processor in the middle and the electronic typesetter/laser printer on the cutting edge. Most printing masters are prepared on typewriters or impact printers, with graphics pasted on or taped in. Those with access to a word processor at least enjoy the rapid word-moving flexibility such systems offer, but most are still shackled to the impact printer--just a fast typewriter--and printed results look about the same as their 1940 counterparts. State of the art electronic publishing systems that drive laser printers are still the exception, even though they save time and labor while producing professionally typeset documents.

**4.2.3 Graphics Equipment.** Most USAF illustrators today work for the local AAVS detachment. One has a choice of negotiating with AAVS for graphics or doing them oneself. Since there are so few technical illustrators left (at least those who know latitude from longitude and millibars from Hershey bars), it is often easier, and a great deal faster, to do it yourself. Although computer graphics are available, and the age of the scanner (for direct electronic input to camera-ready copy) is here, paste-up is still the main way we all do graphics, and it's likely to remain so for some time. With some knowledge of paste-up composition, a little imagination, a can of rubber cement, and a razor blade, authors and editors can produce a creditable job. AAVS can provide some of the materials (like press-on letters and symbols, chart tapes, and shading overlay), but you can order these yourself. We recommend you let AAVS handle the really tough stuff, but be sure you allow them plenty of time. Their workload makes a 5-day wait (even for small jobs) almost automatic.

**4.2.4 The Printing Plant.** Like your graphics shop, the local printing plant is another important editing tool, and one you should not necessarily wait to use until the end of the job. Printers can be a big help in planning your project. They can fill you in on how to reduce graphics to fit a page, how to "halftone" certain hard-to-reproduce images, and how to set up the job to get the best results at the lowest price. They can also tell you how to speak their language in filling out work orders. Learning their terms will save both of you time. You should acquire at least passing familiarity with AFR 6-1--the printers have to live with it, and so do you. Get to know the people at your printing plant, and use them.

**4.3 Planning the Project.** As they say in sprint car racing, "Good start, good finish." It works that way with editing, too. Most editors prefer to start a project by reviewing a manuscript submission from start to finish. By doing so, they can establish at least a mental map of what it will take to do the job and get a rough idea of what the completed job should look like. They can also make a list of missing items (there are always some) and determine graphic requirements. The holistic approach will also give you at least a rough idea of how long the project will take. Exactly how long, you'll find, is almost impossible to forecast. That's unfortunate, since the first question authors ask is "When will this be finished?" Publishing a technical document is not much like rebuilding a carburetor. There is no hourly rate book and no two publications are exactly alike. So unless you have only one document in the work queue at a time, you'll probably miss any publication goal you set hastily. We mention this only so that you don't begin your editorial tour (as many of us have) by making wildly optimistic promises for completed publications. A rough rule of thumb: If, at first glance, it looks like it can be completed in July, don't tell people to start looking for it before September.

**4.4 Editing the Text.** We can no more tell you in this modest volume how to edit text than we can tell you how to make a crosswind landing in a C-141, even if we knew how. Writing and editing are basically instinctive. If you are a good writer and editor (both of which skills require that you first be a good reader), a piece of copy that looks good probably is good. Good writers write to please themselves. Editors should do the same. Never publish anything that does not please you. If you do, you haven't done your job. But let's assume that you have done your job with the text. Gobbledegook is gone, construction is without fault, and the message is "perfectly clear." You're ready for formatting.

**4.5 Folding the Parts into Format.** As already mentioned, ANSI STD Z39.18 is the basic DoD bible for technical publication format. Wisely, it provides for enough standardization to facilitate exchange while providing enough latitude to allow tailoring for unique needs. AFR 8.3-2, *Air Force Technical Publications Program*, also makes a few directive calls, as does AWSR 83-2, *AWS Presentations and Technical Publications*. With all these in mind, we'll start with the cover and work our way through to the back.

**4.5.1 The Cover.** The example chosen and shown in Figure 4-1 is typical of all AWS technical publications. The individual elements are discussed below:

***Cover Design Logo.*** The example shows the standard USAFETAC cover design. If a similar design is used, it should include the unit logo but should not overpower the rest of the information on the page.

***Report Number.*** In standard serial alphanumeric form (unit, two-letter publication type, two-digit year, three-digit serial), the number goes in the upper right-hand corner. This example was set in 24-point helvetica type. The editor assigns and keeps track of publication serial numbers throughout the year.

***Title.*** Center on the cover or on the cover design logo. This example is also in 24-point, a good all-around choice. If there is a subtitle, center under main title, in smaller type. Edit titles carefully. Whittle them down to the absolute minimum--usually no more than 10 words. Try to place the most important idea first. Avoid starting

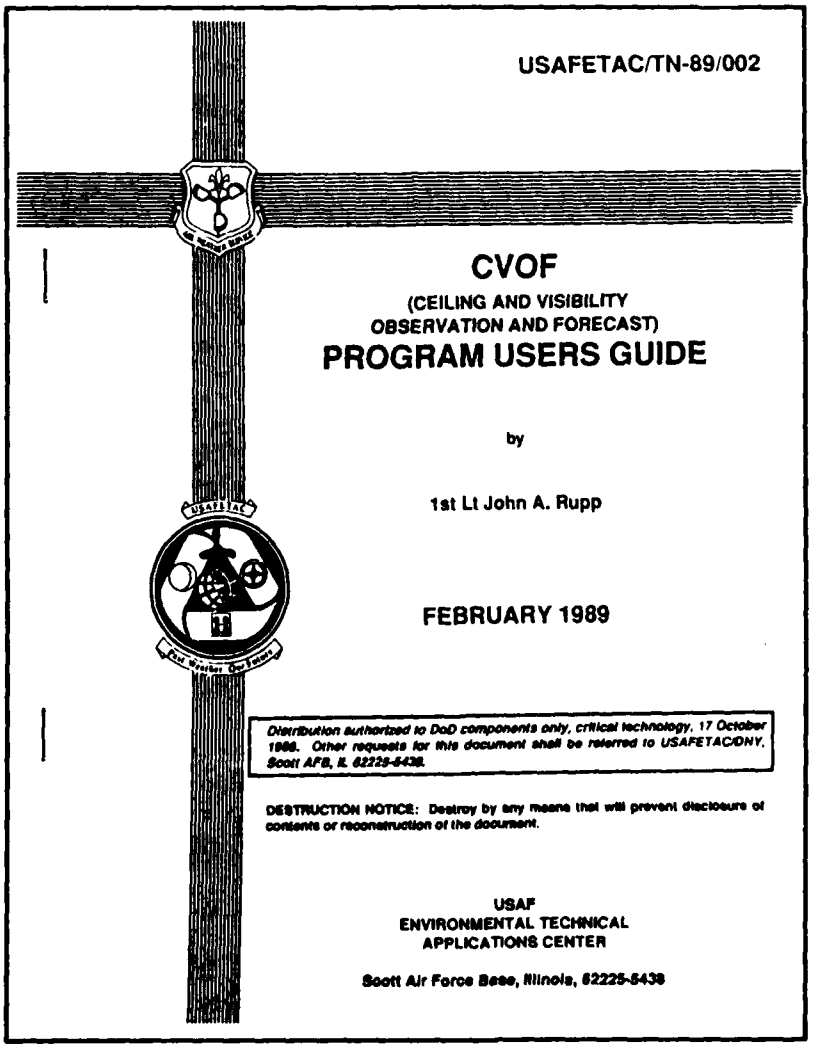
with "A Guide to..." or "A Study of...." If a title includes "Users Manual" or "Analysts Handbook," drop the possessive apostrophe. The rule: When the term is more descriptive than possessive (as in this case), no apostrophe.

***Personal Author(s).*** Center under the title. Use grade (if military) and full name, as shown. Unit of assignment is a judgment call, and is usually included only if the author is not a member of the unit publishing the report.

***Date.*** Center under the title. Use month and year. Avoid precise dates (like 17 May 1986). An exact date contributes little and only complicates cataloging and referencing later.

***Distribution Limitations.*** Center the main limitation statement under the title and date, preferably in a contrasting type style. The box is optional, but the idea is to make the statement stand out. If there is also an "Export Control" warning, center it under the main limitation statement, exactly as shown. Center the destruction notice under the warning and/or limitation statement, as shown.

***Unit Identification.*** Center under other cover matter near the bottom of the page. We suggest slightly smaller type than for the title, but larger than the distribution markings.


USAFETAC/TN-89/002

CVOF

(CEILING AND VISIBILITY OBSERVATION AND FORECAST)

PROGRAM USERS GUIDE

by

1st Lt John A. Rupp

FEBRUARY 1989

*Distribution authorized to DoD components only, critical technology, 17 October 1988. Other requests for this document shall be referred to USAFETAC/DNY, Scott AFB, IL 62225-5438.*

DESTRUCTION NOTICE: Destroy by any means that will prevent disclosure of contents or reconstruction of the document.

USAF
ENVIRONMENTAL TECHNICAL
APPLICATIONS CENTER

Scott Air Force Base, Illinois, 62225-5438

***Figure 4-1. Typical AWS/USAFETAC Cover Page.***

**4.5.2 Review and Approval Page.** Make this page ii, printed as the inside front cover. The cover page is assumed to be page i. As you'll see later, starting the page numbering here will simplify your printing sequence sheet and result in minimum confusion at the printing plant. The first example in Figure 4-2 is used for distribution "A" (unlimited) documents, the second for all others. The "reviewing official" is the person responsible for the technical accuracy of the document. In USAFETAC, the Chief Scientist is normally the reviewing official, but in some cases (like data summaries), it is the branch or section chief. For certain OL-A publications (such as climatic database users handbooks), it is the OL-A Chief. The USAFETAC STINFO Program Manager is the approving official for USAFETAC technical publications. For HQ AWS documents, AWS/XTX and XT, respectively, are the reviewing and approving officials. Wings devise their own "review & approval" schemes. See AWSR 83-3 for specifics.

**REVIEW AND APPROVAL STATEMENT**

USAFETAC/TN-90/002, Severe Storm Forecasting, January 1990, is approved for public release. There is no objection to unlimited distribution of this document to the public at large, or by the Defense Technical Information Center (DTIC) to the National Technical Information Service (NTIS).

PATRICK J. BREITLING
Chief Scientist

***For "A" Distribution***

FOR THE COMMANDER

WALTER S. BURGMANN
Scientific and Technical Information
Program Manager

**REVIEW AND APPROVAL STATEMENT**

AWS/TR-90/005, Lasers on the FEBA, October 1990, has been reviewed and is approved for publication.

ROGER C. WHITON, Lt Col, USAF
Directorate of Aerospace Development

***For "B" through "X" Distribution***

FOR THE COMMANDER

JAMES W. OVERALL, Colonel, USAF
DCS/Technology

***Figure 4-2. Example Review and Approval Statements.***

**4.5.3 REPORT DOCUMENTATION PAGE (STANDARD FORM (SF) 298).** Make this page iii. Most SF 298 entries can be inferred from the examples or from the instructions on the back of the form. Note that since this guide does not address *classified* technical documents, all entries assume that the entire document is unclassified. Since forms completion on a word processor is awkward and impractical, DTIC has granted permission to substitute a simple "list" format. Figure 4-3 is an example of a completed SF 298, and Figure 4-4 is its word processor equivalent. Instructions for preparing the SF 298, "Report Documentation Page, and its word processor equivalent follow:

***Block 2, Report Date.*** Enter month and year.

***Block 3, Report Type and Dates Covered.*** DTIC originally intended these entries to be "final," "interim," or similar, but we recommend "technical report," "technical note," "data summary," "catalog," etc. "Dates Covered" is only required when a specific time period is covered.

***Block 4, Title and Subtitle.*** See 3.11.1. Titles as originally submitted are normally too long. Edit them.

***Block 6, Author(s).*** See 3.11.1.

***Block 7, Performing Organization.*** The performing organization is the unit that publishes the report for the sponsoring/monitoring organization. Example: USAFETAC (performing organization) publishes the AWS Technical Documents Catalog for AWS/XT (monitoring organization).

***Block 8, Performing Organization Report Number.*** Enter the standard alphanumeric report number that you (the editor) have assigned.

***Block 9, Sponsoring/Monitoring Organization.*** See entry for Block 7.

***Block 11, Supplementary Notes.*** Enter any useful information not noted elsewhere on the form, such as supersessions or revisions. Include the AD-number of a revised or superseded document.

***Block 12a, Distribution/Availability Statement.*** Enter the distribution limitation statement exactly as specified by AFR 80-45. Include the export control warning (2.5), if there is one.

***Block 12b, Distribution Code.*** Leave blank.

***Block 13, Abstract.*** The abstract is a sharply condensed description of the document and what's in it. It should answer the question, "What is this document about?" An important part of a bibliography or catalog, it should tell potential readers enough to let them decide whether or not they need to order and read the entire document. Authors may provide an abstract, but it's up to you to edit it. You may have to write it yourself, and you may be ahead by doing so. Stay within 200 words. Shorten it by using phrases for clauses and words for phrases, but keep meanings intact. Don't use uncommon terms, abbreviations or unconventional symbols. If possible, write abstracts for documents with distribution statements other than "A" (unlimited) so that the abstract itself is suitable for unlimited distribution. An excellent "how-to" pamphlet is DTIC's (formerly DDC) "Abstracting Scientific and Technical Reports of Defense-Sponsored RDT&E," March 1968 (AD-667000). ANSI Z39.14-1979 is the national abstracting standard.

***Block 14, Subject Terms.*** Subject terms, properly selected and listed, should lead people who are searching for your document right to it. Basic terms are taken from the "DDC Retrieval and Indexing Terminology," DDC'H 4185.7, May 1979 (AD-A068500). The DDC (Defense Documentation Center--now DTIC) list is not all-inclusive; to provide all subject terms applicable, you may have to enter some of your own. Capitalize the broadest terms, such as METEOROLOGY, CLIMATOLOGY, and ELECTROOPTICS, and enter narrower terms in lower case, as shown in the example. Prefix the terms you consider most important with an asterisk.

***Block 15, Number of Pages.*** The total number of numbered pages (not blanks)--should agree with the "No. of Originals" or "No. of Pages" entries on your printing orders.

***Blocks 17-19. Security Classifications.*** Normally always "UNCLASSIFIED."

***Block 20, Limitation of Abstract.*** As mentioned earlier, abstracts should be written so that they are "unlimited." If they are *not* unlimited, enter the limitation; if they are, enter "UL."

# REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

| 1. AGENCY USE ONLY (Leave blank) | 2. REPORT DATE | 3. REPORT TYPE AND DATES COVERED |
|---|---|---|
| | August 1989 | Technical Note |

**4. TITLE AND SUBTITLE**

The Caribbean Basin--An Electrooptical Climatology for the 8-12 Micron Band, Volume II--The West Indies

**5. FUNDING NUMBERS**

**6. AUTHOR(S)**

Maj Roger T. Edson and Capt Patrick M. Condray

**7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)**

USAF Environmental Technical Applications Center (USAFETAC), Scott AFB, IL 62225-5438

**8. PERFORMING ORGANIZATION REPORT NUMBER**

USAFETAC/TN-89/005

**9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)**

**10. SPONSORING/MONITORING AGENCY REPORT NUMBER**

**11. SUPPLEMENTARY NOTES**

**12a. DISTRIBUTION/AVAILABILITY STATEMENT**

Distribution Authorized to U.S. Government agencies and their contractors, critical technology, May 1989. Other requests for this document shall be referred to USAFETAC/DNE, Scott AFB, IL 62225-5438.

**12b. DISTRIBUTION CODE**

**13. ABSTRACT (Maximum 200 words)**

A report on a comprehensive electrooptical climatology for the West Indies. Study developed by combining important "conventional" weather elements (clouds, precipitation, and fog) with climatologies of atmospheric transmittance in the 8-12 micron band. Transmittamce climatologies were computed by LOWTRAN6 computer model, using 21 stations; periods of record for the 21 stations used varied from 4 to 14 years. A standard gemometry of a 125-meter (410-foot) AGL sensor height and a 4 km (2.16 NM) slant range with a cloud-free line-of-sight were assumed for the transmittance calculations. The 21 stations used were combined into six regions, each with its own distinctive electrooptical climatology. The six regions are: Northwest Cuba, Caribbean Open Waters, Greater Antilles Windward, Greater Antilles Leeward, Lesser Antilles, and Trinidad/Tobago. As noted in earlier transmittance studies, the most important single influence on transmittance conditions is the variation in mean absolute humidity. Local geqgraphy is also an important influence, setting up local effects (such as orographic lift and land-sea breezes) that change the diurnal variation of transmittance from region to region. The consistent trade wind flow produces windward and leeward effects on mountainous islands, with more precipitation and slightly higher absolute humidities producing lower transmittances on the windward sides. At times, favorable transmittance conditions are canceled by unfavorable ceilings, and vice-versa.

| 14. SUBJECT TERMS | 15. NUMBER OF PAGES |
|---|---|
| CLIMATOLOGY, INFRARED WEAPONS, IR-GUIDED WEAPONS,. ELECTROOPTICS, PRECISION-GUIDED MUNITIONS, ATMOSPHERIC TRANSMITTANCE, TRANSMITTANCE CLIMATOLOGY, WEATHER SENSITIVITIES, ATMOSPHERIC EFFECTS, LOWTRAN, LOWTRAN6, CARIBBEAN BASIN, WEST INDIES. | 139 |
| | 16. PRICE CODE |

| 17. SECURITY CLASSIFICATION OF REPORT | 18. SECURITY CLASSIFICATION OF THIS PAGE | 19. SECURITY CLASSIFICATION OF ABSTRACT | 20. LIMITATION OF ABSTRACT |
|---|---|---|---|
| UNCLASSIFIED | UNCLASSIFIED | UNCLASSIFIED | UL |

NSN 7540-01-280-5500

Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std. Z39-18

*Figure 4-3. Completed Standard Form 298.*

## REPORT DOCUMENTATION PAGE

2. Report Date: August 1989

3. Report Type: Technical Note

4. Title and Subtitle: *The Caribbean Basin--An Electrooptical Climatology for the 8-12 Micron Band, Volume II--The West Indies*

6. Authors: Maj Roger T. Edson and Capt Patrick M. Condray

7. Performing Organization Name and Address: USAF Environmental Technical Applications Center (USAFETAC), Scott AFB, IL 62225-5438

8. Performing Organization Report Number: USAFETAC/TN-89/005

12a. Distribution/Availability Statement: Distribution authorized to U.S. Government agencies and their contractors, critical technology, May 1989. Other requests for this document shall be referred to USAFETAC/DNE, Scott AFB, IL 62225-5438.

13. Abstract: A report on a comprehensive electrooptical climatology study for the West Indies. The study was developed by combining important "conventional" weather elements (clouds, precipitation, and fog) with climatologies of atmospheric transmittance in the 8-12 micron band. The transmittance climatologies were computed by the LOWTRAN6 computer model, using 21 stations; periods of record for the 21 stations used varied from 4 to 14 years. A standard geometry of a 125-meter (410-foot) AGL sensor height and a 4 km (2.16 NM) slant range with a cloud-free line-of-sight were assumed for the transmittance calculations. The 21 stations used were combined into six regions, each with its own distinctive electrooptical climatology. The six regions are: Northwest Cuba, Caribbean Open Waters, Greater Antilles Windward, Greater Antilles Leeward, Lesser Antilles, and Trinidad/Tobago. As noted in earlier transmittance studies, the most important single influence on transmittance conditions is the variation in mean absolute humidity. Local geography is also an important influence, setting up local effects (such as orographic lift and land-sea breezes) that change the diurnal variation of transmittance from region to region. The consistent trade wind flow produces windward and leeward effects on mountainous islands, with more precipitation and slightly higher absolute humidities producing lower transmittances on the windward sides. At times, favorable transmittance conditions are canceled by unfavorable ceilings, and vice-versa.

14. Subject Terms: CLIMATOLOGY, INFRARED WEAPONS, IR-GUIDED WEAPONS, ELECTROOPTICS, PRECISION-GUIDED MUNITIONS, ATMOSPHERIC TRANSMITTANCE, TRANSMITTANCE CLIMATOLOGY, WEATHER SENSITIVITIES, ATMOSPHERIC EFFECTS, LOWTRAN, LOWTRAN6, CARIBBEAN BASIN, WEST INDIES.

15. Number of Pages: 139

17. Security Classification of Report: UNCLASSIFIED

18. Security Classification of this Page: UNCLASSIFIED

19. Security Classification of Abstract: UNCLASSIFIED

20. Limitation of Abstract: UL

Standard Form 298

***Figure 4-4. Word Processor Equivalent of Standard Form 298.*** Authority: Defense Logistics Agency (DTIC-HDB) letter, 17 January 1986.

**4.5.4 PREFACE/SUMMARY/FOREWORD.** There should be a preface, summary, or foreword (usually a preface) in every AWS technical document, normally as page iv. Data summaries usually include a "summary." Use this page to explain why the document was prepared and how it relates to associated works. The preface may be used to summarize conclusions and/or recommendations. It may also be used to acknowledge significant contributions to the work, but not routine typing or editorial support.

If the document is a reprint of another publication, acknowledge that fact here and keep a copy of reprint permission in your master file (Example: "Reproduced with permission of Avecon Inc., 5 Chester Drive, Washington, DC 20335, 27 March 1986.")

Use the preface to acknowledge copyrighted material. Do NOT print copyrighted material, or anything that contains copyrighted material (except short excerpts that fall under the "fair use" provision), without a written copyright release that should be filed permanently with the publication master.

If copyrighted excerpts other than those subject to "fair use" appear in the document, acknowledge them in the preface generally, and use footnotes on the appropriate page to acknowledge them specifically. See AFR 110-8, *Inventions, Patents, Copyrights, and Trademarks*, for details. A sample letter format (from AFR 110-8) for requesting permission to use copyrighted materials is shown in Figure 4-5. What constitutes "fair use" of copyrighted material is a fairly complicated call, but is generally permissible "if the resulting work does not exploit the commercial value of the original" (Strong, 1984). Short excerpts from text, tables, or graphs/charts are probably OK, but if you go much beyond that, ask.

**LETTERHEAD**

Name of company
Address
Salutation

Date_____

We are preparing a work to be published for the Department of Defense entitled:

Request permission to include the following material in that work: (title, page, paragraphs, line numbers, etc.), published by your company and written by _____.

Please indicate on one copy of this letter if the material, with an appropriate copyright credit line, may be used in the above work. A self-addressed envelope is enclosed.

Signature element

Permission: The above requested PERMISSION is hereby granted, royalty-free. The material covered by this permission may/may not be placed on sale in the Government Printing Office.

Name of copyright proprietor
or authorized agent

DATE: _____ BY _____

(Title)

***Figure 4-5. Copyright Release Request Format (From AFR 110-8).***

**4.5.5 Table of Contents.** Or simply "Contents," normally page v; not necessary for very short documents (eight pages or less). Use capital letters for main section headings, bibliographies, appendices, glossaries, indices, etc. On a separate page following "Contents," list "Figures" and "Tables," but usually only when there are at least five figures or tables, or when their listing is considered essential. List figures and tables using exactly the same words as in their captions. Use period leaders for page numbers, set flush with the right margin.

**4.5.6 Body of the Text.** This is the heart of the document, and the reason you've gone to all this trouble. For organization, you can use paragraph numbering or not, so long as headings stand out from text in their relative order or importance. As a general rule, use paragraph numbers only when the length or complexity of the document makes them necessary. In short, how the text is organized is up to you and the author. Start page numbering with "1" or "1-1" (your call), depending on how (or if) you've decided to number chapters or sections. Always keep reader convenience in mind. Appendices (if there are any) will be numbered "A-1," "B-1," and so on. Always start a new section on a new right-hand page.

**4.5.7 Equations.** If your word processor will handle equations, fine. If not, you'll have to do them on a typewriter and paste them in. Be sure that you and the author are on the same frequency here--equations and their symbols are one of the most frequently miscommunicated items in publishing. Some general rules:

- Center equations on the page and between preceding and succeeding lines with enough spacing (usually at least two lines) to keep them from getting tangled up with the text.

- When equations (or series of equations) are used as parts of sentences, use standard comma-period punctuation.

- When an equation is too long for the page and must be broken, do it before an equal, plus, or multiplication sign.

- Separate numerators and denominators with lines as long as the longer of the two, and center both on the 2line.

- Make opening and closing parentheses, brackets, and braces the same height as the expressions they enclose.

- Align groups of separate but related equations by their equal signs and indent and center the group as a whole.

- Enclose equation numbers in parentheses and set flush with the right margin.

- When referring to equation numbers in text, do <u>not</u> include the parentheses.

**4.5.8 Figures.** Place figures as closely as possible to their first reference in text, preferably following that reference. Try to insert figures so as to avoid "white space." The print shop can help with proportional reduction, and can, in fact, reduce and insert figures for you. All you have to do is you show them (with corner tic marks in non-reproducible blue pencil) where they go. When using photographs (or any material that has to be half-toned or photographed), do *not* paste it up. Instead, mark its location on the camera-ready page and provide it to the printer separately. Be sure you identify each piece, preferably with non-reproducible blue pencil. If you don't do this, the plant has to separate the materials themselves--a messy and time-consuming process. Some general rules:

- When a figure (or table) is to be placed lengthwise on a page ("landscape" as opposed to "portrait" mode), place it so the reader views it by turning the document <u>clockwise</u>.

- Be consistent with figure captions (Figure 1. The value of...) throughout the document. Figure captions are centered under the figure (but table captions are <u>above</u> the table).

- Callouts (labels) should be in capitals that will appear in print no smaller than 8-point (1/10-inch). These should also be consistent throughout the document, and placed horizontally.

- Discourage the preparation of computer graphics with colored pens; except in extremely unusual circumstances, color is not used. Try color substitutes, such as cross-hatching, shadowing, screening,

or dots. You'll have a problem finding black and white base maps--most are in color. Ask the printing plant to try halftoning your color map. Sometimes it works, sometimes it doesn't. When it doesn't, you'll have to have base maps redrawn or retraced.

**4.5.9 Tables.** Prepare and place tables in the same way as figures, but put the caption (TABLE 1. Heat Stress of...) at the top. When a long table is placed sideways on facing pages, it's not necessary to repeat the caption on the second page. Don't go overboard with vertical and horizontal separation lines when spacing will do the job. Insist on a first carbon of computer-produced tables--originals print poorly. Give units of measure in column headings--don't repeat them in every column. NOTE: It has recently been shown that computer printouts (14 3/4 X 10 1/2 inches) can be compressed when downloaded to smaller computers such as the Z-248. This compression, when the correct printer pitch is selected, results in a product that fits on a standard 8 1/2 X 11 inch page and is easier to insert and read than the original reduced and copied computer printout.

**4.5.10 References In Text.** Footnotes (if you must use them) are referenced in text to a superscripted numeral and placed on the bottom of the page under about a 1-inch line. If you plan to include a list of references at the end of the report, use consecutive superscripted numerals in the same way as for footnotes. Label the list "REFERENCES," and start it on a new right-hand page.

**4.5.11 Bibliography.** If the list of reference materials used in preparing this document is not specifically referenced to the text (as with "REFERENCES"), but is just a general listing of materials used to prepare the document, label it "BIBLIOGRAPHY." Start on a new right-hand page.

**4.5.12 Appendices.** If there's just one, label it "APPENDIX." Label two or more as "APPENDIX A," "APPENDIX B," and so on. Page numbers are A-1, B-1, etc. Number figures, tables, or equations that appear in an appendix to match its letter designation. Start each appendix on a new right-hand page.

**4.5.13 Glossary.** Use a glossary to list and explain (in alphabetical order) all those strange and uncommon words or expressions included in the document. The list may include abbreviations, acronyms, and symbols. If the situation calls for it, you may wish to use separate lists--i.e., one for abbreviations and acronyms, one for words and terms, and another for symbols. It's your call.

**4.5.14 Index.** Not normally included unless an anticipated need for frequent reference dictates one. Preparing any index (including the subject index we're talking about here) is not an easy task, even for a professional indexer. There are several methods, one of which requires a stack of index cards. At the top of each card, write the main subject, then add subcategories and page numbers. Some word processors and electronic publishing systems have the capability for (almost) automatic indexing, as well as for the creation of tables of contents. We strongly recommend some reading on the subject before attempting such an effort; one such reference is *Words into Type*, pp. 76-96, by Marjorie E. Skillin and Robert M. Gay, Prentice-Hall, 1974.

**4.5.15 Distribution List.** Always the last page (or pages) of printed matter. The page need not be numbered. When the distribution list has been completed, label it "DISTRIBUTION." List complete mailing addresses with period leaders and number of copies set flush right. The first time you have to mail errata sheets or revisions to the original recipients, you'll know why complete addresses are required. Check the list carefully against the distribution limitation statement, making sure there are no addressees that violate the intent of the limitation.

**4.6 Preparing Camera-Ready Masters.** As mentioned earlier, the so-called "camera-ready" master can be prepared on anything from a typewriter to a typesetter. If you're lucky enough to have access to an electronic publishing system and a laser printer, you can actually set type. You should, therefore, develop at least passing familiarity with the ins and outs of typesetting which has, up to now, been considered one of the black arts. It's not all that difficult, however, and user-friendly equipment makes it possible to "play by ear." But you should devote some study to the subject. There are a number of good references, but we highly recommend these:

*Arnold's Ancient Axioms*, Typography for Publications Editors, by Edmund C. Arnold, Ragan Report Press, Chicago, 1978.

*Words into Type*, Marjorie E. Skillin, Third Edition, Prentice-Hall, 1974.

*Graphic Design for the Computer Age*, Jan V. White, Watson-Guptill Publications, New York, 1988.

If you're limited to typewritten masters (including word processor output from impact printers), you may wish to use reduction copy. Although some material (like covers and very small jobs) is shot 1:1 (direct), most work is prepared on AF Form 1102, *Typing Guide for 20, 25, 30% Reduction to 8 1/2 X 11 or 8 3/4 X 10 3/4*. The latest version at this writing was May 84. You'll note that the form has three blue boxes--one for 20% reduction, one for 25%, and one for 30%. Although many typewritten documents are done in 12-pitch, we recommend the larger 10-pitch for reduction copy. If in doubt of the printed outcome, you can get a rough idea of how your document will look by running off a sample on a copier with a reduction capability. Many copiers can reduce about 25%. Do not, in any case, reduce below the level of easy readability. Comprehension outranks paper conservation.

**4.7 Submitting Print Orders.** There are two print work orders: DD Form 843 (Requisition for Printing and Binding Service) and DD Form 844 (Requisition for Local Duplicating Service). The DD Form 844 (short form) can be used for most jobs done locally. An example is shown in Figure 4-6. DD Form 843 is the long form (see Figure 4-7). Use it for contract printing (off the installation), for large, complicated jobs, or when you want the plant to register and assign a "bug number" that can be used to reference the negatives (kept at the plant) against possible reprint orders.

On either form, be sure to tell the printer exactly what you want. Specify reduction, margins (at least 3/4-inch), how you want the holes drilled, and binding. It's generally *assumed* you'll want at least a 3/4-inch margin, but it's safer to specify. A 1-inch margin is best, especially if you plan to have the document drilled for notebook holes. Specify white paper, at least #50 bond as used to print this document. "Hard-use" covers (white or colored 110 lb index, as prescribed by JCP Specification K10) should be used for "permanent documents (such as technical reports...) that have frequent or long use outside of mechanical binders." (AFR 6-1, Para 3-12b).

**REQUISITION FOR LOCAL DUPLICATING SERVICE**

DATE OF REQUEST: 22 Dec 89 | DATE REQUIRED: 12 Jan 90 | JOB NUMBER:

TO: 1201 FPS/IMR

FROM: (Organization and room number) USAFETAC/LDE

1 FOR REFERENCE CONSULT (Name and Phone No.): SGT GAGE, 66648

2 DESCRIPTION (Title, Form Number, etc.): USAFETAC/TN-86/001 (REVISED) AUTHOR-EDITOR GUIDE TO ...

3a DELIVER TO: USAFETAC/LDE

b NAME AND PHONE NUMBER OF PERSON TO CALL IF TO BE PICKED UP: —

4 NO OF ORIGINALS: 68

5 NO COPIES EACH: 300

6 TYPE OF REPRODUCTION: [X] OFFSET [ ] MIMEO [ ] OTHER (Specify)

7 SECURITY CLASSIFICATION: [X] UNCLASSIFIED [ ] OTHER

8 DISPOSITION OF ORIGINALS: [X] RETURN [ ] DESTROY

9 PAPER SPECIFICATIONS: [ ] OFFSET DUPLICATION [ ] SPIRIT DUPLICATION [ ] OTHER (Specify) [ ] 8 x 10½ [ ] 8 x 12½ [ ] 8½ x 14 [X] OTHER (Specify) 8½ X 11 [ ] WHITE [ ] OTHER (Specify)

11 PRINT: [ ] 1 SIDE [X] A TO H [ ] H TO F [ ] HEAD TO [ ] L [ ] R

12 COLLATE: [X] YES [ ] NO STAPLE: [X] YES [ ] NO

10 COLOR INK: [X] BLACK [ ] OTHER

14 SIGNATURE OF REQUESTER (This requisition contains no copyrighted material other than that indicated on attached copy right release.): GEORGE M. HORN, TECH PUBS EDITOR

13 ADDITIONAL SPECIFICATIONS (Including distribution, punching, padding, location of staples, etc.): 3 Holes STD LEFT -- "HARD-USE COVERS"; SEE MAC/IMR LTR, 20 DEC 89

15 SIGNATURE OF APPROVING OFFICIAL: WALTER S. BORGHORN, DIRECTOR, AFC TECHNICAL LIBRARY

FOR REPRODUCTION UNIT USE ONLY

| 16 DATE RECEIVED | 17 PRIORITY | 18 OPERATOR | 22 DATE REQUESTER NOTIFIED JOB IS COMPLETE |
|---|---|---|---|
| 19 NO OF COPIES REPRODUCED | 20 DATE DELIVERED | 21 JOB RECEIVED BY | |

DD FORM 1 OCT 78 844 PREVIOUS EDITION WILL BE USED

***Figure 4-6. Example DD Form 844 (as prepared to have this document printed).***

**REQUISITION FOR PRINTING AND BINDING SERVICE**

FUND: [X] APPROPRIATED [ ] NON-APPROPRIATED
DATE: 21 DEC 89
ACTIVITY ORDER NUMBER:
PLANT USE ONLY:
JOB NUMBER:

TO: MAC/IMA
THRU: (Appropriate Printing Control Authority)
FROM: (Originating Agency and Person to contact & telephone extension) USAFETAC/LDE

1 TITLE OF PUBLICATION: Potential Advection Controls
2 NUMBER AND DATE: USAFETAC/TN-86/008 JAN 1990

3. PURPOSE, FUNCTION, ECONOMIES EFFECTED AND CONCURRENCES:

4. QUANTITY IN: [ ] SHEETS [ ] SETS [X] BOOKS [ ] PADS [ ] OTHER (Specify in Item 13)

| a. PARTIAL DELIVERY REQUESTED | | b. COMPLETE DELIVERY REQUESTED | |
|---|---|---|---|
| DATE | QUANTITY | DATE | QUANTITY |
| | | 25 JAN 89 | 450 |

5 SIZE OF PUBLICATION

| a. TRIM SIZE | | b. FOLDED TO | |
|---|---|---|---|
| WIDTH | LENGTH | WIDTH | LENGTH |
| 8 1/2 | 11 | | |

6 NUMBER OF PAGES: 150

7. BINDING (Use Item 13 for additional instructions)
[ ] LOOSE [ ] SIDE STITCHED [ ] PAD [ ] TOP [ ] LEFT [ ] RIGHT [ ] BOTTOM
[ ] GLUED [ ] SADDLE STITCHED SHEETS IN PAD: SETS IN PAD: SHEETS IN SET:
[X] OTHER BAND

8 PAPER STOCK

| COPIES | BASIS WEIGHT | KIND | COLOR |
|---|---|---|---|
| 1 | #50 | BOND | WH |

9 PRINT

| COLOR INK | FACE ONLY | HEAD TO HEAD | HEAD TO FOOT | HEAD TO SIDE |
|---|---|---|---|---|
| BL | | ✓ | | |

10. PUNCHING

| NR HOLES | DIAMETER | C TO C | KIND | POSITION |
|---|---|---|---|---|
| 3 | 5/16" | 4 1/4" | STD | LEFT |

11. MATERIAL DISPOSITION

| | HOLD | DESTROY | RETURN TO |
|---|---|---|---|
| NEGATIVES | | | USAFETAC/LDE |
| ORIGINALS | | | |

12 CLASSIFICATION: UNCLASSIFIED

13 ADDITIONAL INSTRUCTIONS. DUMMY ATTACHED [ ] YES [ ] NO (Perforations, scoring, prenumbering, etc.)
Sequence sheet Attached. Reduce to 8 1/2 x 11 with 3/4" margins side & bottom, 1/2" top. Hard covers (white or colored 110LB index) See MAC/IMA LTR 19 Dec 89.

14. DISTRIBUTION INSTRUCTIONS (If desired, also indicate person to be notified when job is completed)
Ship to USAFETAC/LDE, BLDG 859. Notify G. Horn, 64044.

15 APPROPRIATION CHARGEABLE:

CERTIFICATION
THAT THE USE OF MORE THAN ONE COLOR IS IN ACCORDANCE WITH DEPARTMENTAL REGULATIONS
THAT THE ILLUSTRATIONS USED IN THIS PUBLICATION ARE NECESSARY AND RELATE ENTIRELY TO THE PUBLIC SERVICE
THAT THIS WORK IS AUTHORIZED BY REGULATIONS AND IS NECESSARY TO THE CONDUCT OF OFFICIAL BUSINESS.

16 ORIGINATOR (Typed Name, Signature and Date)
GEORGE M. HORN, 21 Dec 89

17 ACTION BY PRINTING CONTROL AUTHORITY
[X] APPROVED [ ] DISAPPROVED
TYPED NAME, SIGNATURE AND DATE: 21 Dec 89
WALTER S. BURGMANN GS-12
DIRECTOR, AWS TECHNICAL LIBRARY

| FOR PLANT USE ONLY | 18 DATE RECEIVED | 19 PRIORITY |
|---|---|---|
| 20. DATE PROMISED | 21 DATE COMPLETED | 22 DATE DELIVERED |

| 23 PRESS SIZE | HOURS IN USE | NUMBER OF MASTERS | PRESS IMPRESSIONS | PRODUCTION UNITS |
|---|---|---|---|---|
| X | | | | |
| X | | | | |
| X | | | | |
| X | | | | |
| X | | | | |

RECEIPT OF COMPLETED JOB

| 24. RECEIVED BY | 25 ORGANIZATION SYMBOL | 26 DATE |
|---|---|---|
| | | |

DD FORM JUL 68 843

*Figure 4-7. Example DD Form 843 (as prepared for a contract project).*

Most printers require a sequence sheet such as the MAC Form 499 shown in Figure 4-9. Use this form to arrive at an accurate page count. List every page and its number in sequence, identifying fronts and backs. If a page is to be blank, enter "BLANK." Every page (even if it has not been assigned a printed page number) must be identified for the printer, both on the page in non-reproducible blue pencil) and on the sequence sheet. Start by entering the cover as "COVER," with page ii as its back. The first pages of each of the following should be a "front" page: table of contents, chapters or sections, references, bibliographies, appendices, definitions, abbreviations, index, and distribution list. When you've completed the sequence list, count the number of pages and subtract the blanks. The result will be used as the "number of originals" on your print order form. Remember that our convention for starting new right-hand pages for some parts of the document is going to result in at least some blank pages. The back cover is always blank, even if that means that the last page is blank on both sides.

**SEQUENCE SHEET**

PUBLICATION TITLE: USAFETAC/TN-86/001 (REVISED) AUTHOR-EDITOR GUIDE TO...

PREPARED BY (Name, Grade): Sgt Corinne Gage

OFFICE SYMBOL/PHONE/STOP NO: USAFETAC/LDE, 66648

DATE: 22 Dec 89

| | PLANT/CDC USE | FRONTS | BACKS | PLANT/CDC USE | FRONTS | BACKS | PLANT/CDC USE | FRONTS | BACKS |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | cover | ii | | 44 | 45 | | | |
| 2 | | iii | iv | | 46 | 47 | | | |
| 3 | | v | vi | | 48 | 49 | | | |
| 4 | | vii | BLANK | | 50 | BLANK | | | |
| 5 | | 1 | BLANK | | 51 | BLANK | | | |
| 6 | | 2 | 3 | | 52 | 53 | | | |
| 7 | | 4 | 5 | | 54 | 55 | | | |
| 8 | | 6 | 7 | | 56 | 57 | | | |
| 9 | | 8 | 9 | | 58 | 59 | | | |
| 10 | | 10 | 11 | | 60 | 61 | | | |
| 11 | | 12 | 13 | | BLANK | BLANK | | | |
| 12 | | 14 | 15 | | | | | | |
| 13 | | 16 | BLANK | | | | | | |
| 14 | | 17 | 18 | | | | | | |
| 15 | | 19 | 20 | | | | | | |
| 16 | | 21 | 22 | | | | | | |
| 17 | | 23 | 24 | | | | | | |
| 18 | | 25 | 26 | | | | | | |
| 19 | | 27 | 28 | | | | | | |
| 20 | | 29 | 30 | | | | | | |
| 21 | | 31 | BLANK | | | | | | |
| 22 | | 32 | 33 | | | | | | |
| 23 | | 34 | 35 | | | | | | |
| 24 | | 36 | 37 | | | | | | |
| 25 | | 38 | 39 | | | | | | |
| 26 | | 40 | BLANK | | | | | | |
| 27 | | 41 | 42 | | | | | | |
| 28 | | 43 | BLANK | | | | | | |

PLANT/CDC USE

REORDER NO

CURRENT NO

MAC FORM 499 NOV 78

***Figure 4-8. Example MAC Form 499.***

You'll want most documents printed head-to-head, collated, drilled, and stapled. For documents too thick for staples, but that must be drilled for use in a three-ring notebook, you might ask for paper banding or "blister pack." The latter seals individual documents in plastic and makes them easy to handle and mail. For larger publications not intended for filing in looseleaf binders, there is something called "perfect" binding. Here, the spine is roughed, an adhesive applied, and a cover glued on. Perfect binding is relatively inexpensive and results in a strong document, but one that is not easily pulled apart.

If your total order exceeds a certain number of units (number of pages times number of copies--ask your local plant what their limit is), it will have to go off the installation to a contract printer. This will take more time (usually at least 30 days) and you should plan for it.

When the job is done, quality control a sample copy, especially from contractors. If a contractor has done wrong, most will require the entire job back before making amends. A local printer can usually fix most simple errors quickly.

Questions on printing? See AFR 6-1 and applicable supplements. When in doubt, ask the printer.

**4.8 Errata.** If serious errors (i.e., those that will affect the validity of the document) are discovered after publication and distribution, publish an errata for distribution to all recipients of the original document. Errata are to be distinguished from "changes." Errata correct mistakes, and are the alternative to recall and republication. A revision, on the other hand, suggests that material in the original document is to be changed or updated--revisions are discussed in 4.9. Send a copy of the errata sheet to each of the original recipients of the document as they were listed on the original distribution page. File a copy of the errata with each stock copy of the document. If the document should ever be reprinted, the cover should note inclusion of the errata; for example, "Includes November 1986 Errata." Figure 4-9 is an example of an actual errata sheet.

**4.9 Revisions.** Strictly speaking, most technical documents (excluding catalogs and data summaries) do not lend themselves to change, per se, since the original document was intended to represent conclusions, views, or situations that were valid at the time the document was written. As such, the document is *history*. And while it's possible to revise *interpretation or analysis* of history, it's not possible to revise history itself. For that reason, revisions of or changes to technical publications are discouraged, except in the case of what are obviously "how-to" documents (such as AWS/TR-79/006, the AWS handbook for Skew T preparation and use). These documents are exceptions to the general "Don't revise history" rule because they were, for the most part, converted some time ago from AWS manuals--ironically to insure their permanence! When you *must* publish a revision, be sure you advertise the fact that it is, in fact, a revision. Under the report number in the upper right-hand corner of the cover, print "REVISED." Retain the original report date, but underneath, print the date of the revision. Correct the original DD Form 1473 or Standard Form 298 as necessary, but be sure to describe the revision in "Supplementary Notes" (Block 18 or 11 depending on form). Be sure the revised publication is sent to DTIC for re-registry, new microfiche, and a new AD-number.

**4.10 DTIC Registry.** It is the editor's responsibility to insure that two copies of all completed technical publications are sent to DTIC for registry. Wing editors complete their responsibility toward DTIC registry when they send five copies of each publication to USAFETAC/LDE.

**4.11 Document Limitation Changes.** Maintaining documentation of changes to distribution limitation statements (as prescribed by AWSR 83-2) is normally an editorial responsibility. Documentation is in the form of a memo for record filed with the publication master. Wings should notify USAFETAC/LD of all such changes so that DTIC can be advised and the technical document catalog updated.

**4.12 Primary Distribution.** Even if not strictly an editorial responsibility, editors should do the best they can to insure that primary distribution of each newly published document has been executed according to the printed distribution list.

## ERRATA--MARCH 1989

## AWS/TR-79/006

## THE USE OF THE SKEW T, LOG P DIAGRAM IN ANALYSIS AND FORECASTING

**Page 5-39, Paragraph 5.24.10, second column: In the expression following the actual SWEAT Index, change "The entire shear term [*125(S+0.2)*] is set to zero when any of the following four conditions are met.," to "The entire shear term [*125(S+0.2)*] is set to zero when any of the following four conditions are *not* met."**

***APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED.***

**UNITED STATES AIR FORCE**
**AIR WEATHER SERVICE (MAC)**

**Scott Air Force Base, Illinois 62225-5008**

*Figure 4-9. Example Errata Sheet.*

# Chapter 5

## STYLE GUIDE

*I never write metropolis for seven cents because I can get the same price for city.*
*I never write policeman because I can get the same price for cop.*

--Mark Twain

There are hundreds of publications dedicated to "getting the words right." Some are listed in the bibliography. In the first section of this chapter (*The Words*), we've condensed some of these materials into a short dictionary of words and terms frequently abused by technical writers. Other sections summarize instructions for the proper treatment of numbers, punctuation, compound word formation, and syllabication.

## THE WORDS

**Abbreviation** A contraction--the shortened form of a word or words, usually verbalized as the original word. Examples: APRT, FCST, INTL, BKN.

**About** Suggests inexactness; redundant when other such suggestions are given. In "Researchers estimated there were about 500 microns in each droplet," there are three suggestions of inexactness: *estimated*, *about*, and the round number *500*. Don't overdo it. Incidentally, *about* is nearly always an acceptable substitute for *approximately*, and shorter.

**Academic degrees** Use an apostrophe in bachelor's degree, master's degree, etc. Use abbreviations (M.A., Ph.D) only after full names.

**Academic departments** Use lower case except for proper names or adjectives (the meteorology department, the English department).

**Accrue** A legal and financial term best left to lawyers and accountants.

**Acrinab** A recently coined acronym for "acronymns, initialisms, and abbreviations."

**Acronym** The initial letters (or parts) of a compound term, usually read or spoken as a single word. Examples: RADAR, LASER, LANTIRN. Many such coinings gradually lose their capitalization after falling into common usage. Examples are the legitimate words radar and laser.

**Activity** Needless padding, but popular with TV weatherfolk, as in "We expect some thunderstorm activity this evening."

**Additionally** Try not to begin a sentence with "additionally." Rewrite it if you have to.

**Advance planning** "Planning" is the "laying out of a future course." To precede it with "advance" is not only redundant, but ridiculous. The same goes for "pre-planning," "future planning," and all variations thereon. See Tautology.

**Affect, effect** "Affect" is a verb--it is never used as a noun. "Effect," on the other hand, can be used as verb or noun. When used as a verb, effect means "to bring about." As a noun, an "effect" is a result. Examples: "It did not affect the experiment," "The effect was amazing," and "He effected his escape through the hatch."

**After-** No hyphen when used as a prefix to form a noun (aftereffects), but use a hyphen to form compound modifiers (after-hours conference).

**Afterward** Not afterwards.

**All right** is all right. Alright and allright are not.

**Allude, refer** Not synonymous. To "allude to" is to make *indirect* mention; to "refer to" is *direct* mention.

**Alternative** From the Latin, "alter," meaning "one or the other." Good usage does not permit more than one "alternative."

**Along these lines** As in "We investigated further along these lines." Redundant. "We investigated further" will suffice.

**Among, between** *Between* is ordinarily used to express relationships between only two things, with *among* reserved to all else. But *between* (from "by twain") is also properly used to express a relationship between more than two things when they relate to other things individually or generally.

**Amount, number** "Amount" refers to *bulk* (a large amount of snow). "Number" refers to *units* (a large number of hailstones).

**And/or** The term has occasional use as the alternative to otherwise ponderous expressions, but it should never be used as a cop-out for inexact thought. Technically, "apples and/or oranges" means "apples and oranges, or both." (At least that's what we're told--we've never been able to pin it down precisely, either.) Be careful with and/or variations, such as "rain/snow." Do you mean rain and snow? Rain or snow? Rain and snow mixed? The space saved by the omitted word is seldom worth the resulting confusion.

**Antenna** The preferred plural is "antennas," unless you're discussing bugs.

**Anticipate, expect** To *anticipate* is "to consider in advance or expect something with preparation" (we anticipated the storm and moved the airplanes). To *expect* is simply "to look forward" (We expect a drop in pressure).

**Apprise, appraise** To *apprise* is to notify; to *appraise* is to place a value on.

**As if, as though** Always followed by the subjunctive were (It looked as if the sky were falling).

**Assure, insure, ensure** All three are derived from the Latin ad securus, "to secure." "Assure" derives in turn from the Middle English assuren, and means literally "to give assurance to," as in "I assure you that this is correct." Insure and ensure, both from the same latin root and cytomologically interchangeable, are correctly used in the sense of making certain, as in, "They insured (or ensured) that the conclusion would be the same." Recently, however, there has been a usage shift in favor of using "insure" only in the strict sense of underwriting (i.e., the insurance business). No matter which you use, there doesn't seem to be much chance for misunderstanding. Just don't use "assure" for "ensure or insure," both of which, by the way, are normally followed by "that."

**As the result of** Few actions produce only one result. In "As the result of this accident, which involved seven trucks and a circus train, an elephant bruised his trunk," could a bruised trunk have been the only result? Make it "as *a* result of..."

**As to whether** As in "There was doubt as to whether the experiment would work." Just plain *whether* will do. Better yet, "It was doubtful the experiment would work." Still better: "The experiment probably wouldn't work."

**At the present time, at this time** The latter expression enjoys heavy favor with MAC passenger terminal announcers, but they're both redundant. Try "now."

**Balance** Used too often in place of remainder or rest of (We used the rest of (not balance of) the compound).

**Baseline** A term used in describing communications/computer architectural systems. It is *not* interchangeable with "inventory," especially in less esoteric contexts.

**Between** Between goes best with *and* ("between 1980 and 1986," not "between 1980 to 1986" or "between 1980-1986"). See *among*.

**Biannual** Twice a year. *Semiannual* is every 6 months. Caution: both are often confused with biennial (q.v.). See bimonthly.

**Biennial** Every 2 years.

**Bimonthly** Every 2 months. Thanks to continued misuse, many dictionaries now carry the supplemental notation, "Sometimes, twice a month." As a result, the word now has several meanings not discernible in context. Suggestion: If you *mean* every 2 months, *say* every 2 months. If you *mean* twice a month, *say* twice a month.

**By means of** More padding. Say "by" or "with."

**Centered around** Quasi-metaphorical language based on Euclidean geometry. The center can't be "around" anything, and the thought is geometrically senseless. If you insist on circular thought, say "centers on" or "revolves around." As a last resort, try "concerned with."

**Cognizant of** Pretentious, and usually used incorrectly. Try "aware of," "familiar with," or "knows about."

**Collocate** Not co-locate or colocate. Pronounced cahl-uh-kate.

**Comparison** Compare unlike things *to* each other--compare like things *with* each other. Examples: "The roundness of the earth is compared to that of an orange." "Compare the price of a Ferrari with that of a Yugo."

**Completely eliminated** "Completely" is redundant. Same story on "totally demolished."

**Comprise, compose** To *comprise* is to embrace or include. The whole comprises the parts, and never vice-versa. Examples: "The database comprises six sections," or "The database is composed of six sections." There is no such expression as "comprised of."

**Concur** Literally, "run together," from the Latin *com + currere*. Although "agree" happens to be a synonym, it is not an exact one. The precise meanings of "concur" are: (1) to happen together or coincide, (2) to act together to a common end or single effect, (3) to approve (as of a statement), and finally (4) to agree, as with an opinion.

**Conservative** It means "not likely to be changed," and is not synonymous with "safe," "low," or "moderate." A conservative estimate is not necessarily a low or safe one, but one that will probably not have to be changed. The misuse comes from the thought that to be conservative is to be cautious--hence, "a cautious (conservative) estimate."

**Contained** Redundant to "the material contained in...." "Contain," by the way, is not synonymous with "hold." It connotes only "to have within," while "hold" expresses *capacity*. In other words, while a container may *contain* a pint, it may *hold* a quart.

**Contraction** See *abbreviation*.

**Contrast** As a verb, it takes the preposition "with" (Contrast this with that). As a noun, it can take of, to, with, or between.

**Continual, continuous** "Continual" is over and over, frequently repeated. "Continuous" is without interruption, unbroken. To illustrate the difference, consider that while *continual* sex is possible for most humans, few have the capacity for such activity on a *continuous* basis.

**Contributing factor** "Contributing" is redundant.

**Credible, creditable** To be *credible* is to be believable (the more common *incredible* is a memory aid). *Creditable* means "worthy of praise."

**Data** Technically, *data* is the plural of *datum*. However, much of modern usage is in the form of the collective noun; that is, although data is technically plural, it is often singular in construction and therefore calls for a singular verb. Treating collective nouns (such as data) as consistent plurals is needlessly pedantic and results in such awkward expressions as, "Your data are ready," and "All the existing data point to this conclusion." As Isaac Asimov says, "What's the use of saying 'The data are' when to say it will cause everyone who hears it to consider you illiterate? 'Data' is plural in Latin, singular in English."

**Database** Through evolution, one word. Frequently used compound words tend to evolve into one. Examples: base-ball to baseball, stair-case to staircase.

**Descriptive** Often redundant, as in "descriptive title," or "descriptive climatology."

**Dew point** Two words.

**Different than** Never. Things differ *from* each other.

**Dilemma** More than a problem. Literally, "two horns." A dilemma offers a choice between two (and only two) equally unpleasant courses of action. For example, if you were faced with the choice of staying with a burning airplane or jumping out without a parachute, you would have a textbook *dilemma* on your hands. If the situation doesn't meet this strict criteria, however, all you would have is a problem, a perplexity, or a predicament. "Between a rock and a hard place" is an apt description of a dilemma.

**Discreet, discrete** To be discreet is to be prudent or circumspect (He was discreet about his involvement). Discrete means detached or separate (This system offers eight discrete frequencies).

**Disk, disc** "Disk" is preferred, except to describe phonograph records and the newer compact disc (as in CD-ROM).

**DoD vs. DOD** Even though USAF has established the convention that "Department of Defense" is abbreviated

"DOD," Defense calls itself (in all its official publications and correspondence) "DoD" (small "o").

**Dry bulb** Two words.

**Due to** Careful writers don't start sentences with "due to." Consider substituting "because of" whenever the "due to" urge crops up.

**Each** Use "each" only with singular thoughts. "Each month" is acceptable, but "each 30 days" is not. And don't substitute "each" for "every" indiscriminately. "Every (not each) step of the experiment was verified."

**Earth** Capitalize when used as the proper name for the planet. Same applies to "Sun" and "Moon."

**e.g., i.e.,** e.g. (from *exempli gratia*, "for the sake of an example") means exactly what it does in Latin. i.e. (from *id est*, "that is," or "that is to say") also retains its original meaning. By substituting their exact meanings, you'll note they are not interchangeable. Both expressions are normally preceded by semicolons and followed by commas. Do not add *etc.* to a series introduced by e.g.

**East and West Germany** Preferred to German Democratic Republic and Federal Republic of Germany.

**Electrooptics** Not "electro-optics" (through evolution, same as "database," "cooperate," and "coordinate").

**Encountered, experienced** Not synonymous, not interchangeable. Since *encounter* means "to meet with implications of hostility," the movie was correctly named. It could not have been called "Close Experiences of the Third Kind."

**End result** Conceivable only in a mathematical problem for which there are *intermediate* results. In plain writing, results are results.

**Enhance** To elevate, heighten, or increase. You probably really mean "improve."

**Environment** Overused as padding, as in "The area was in a thunderstorm environment," or "They were working in an austere environment." See *situation*.

**Equal** There is no comparative. "More equal" is wrong, but "more equitable" is OK.

**et al.** Not "et. al." Abbreviation for *et alii*--literally, "and others." Also, *et alibi*, "and elsewhere."

**etc.** Abbreviation for *et cetera*--literally, "and so forth." Never use etc. at the end of a list introduced by "e.g.," "such as" or "including." Always followed by one period, even at the end of a sentence. Don't use etc. to mask laziness or withhold important information.

**Exists** Instead of "A test program existed," say "There was a test program." The same goes for "in existence," "in being," and "existing conditions."

**Factor** An overused "omnibus" word. There must be hundreds of words with more precise meaning for a particular application. Try some.

**Farther, further** "Farther" implies *physical* distance (Dallas is farther than Fort Worth). "Further" is used to signify all else (Nothing is further from my mind).

**Flaunt, flout** To *flaunt* is "to wave about proudly," as in "If you've got it, flaunt it." To *flout* something, on the other hand, is to treat it with contempt. If we wanted, for example, to "flaunt" the Privacy Act (as a sign on a nearby copier suggests we *not* do), we would probably run a copy up the flagpole.

**Follow up** The verb. Follow-up is the adjective.

**For the purpose of** More padding. Substitute "for" or "to."

**Formulas, formulae** "Formulas" is preferred.

**Fuse vs. fuze** A *fuse* is an electrical safety device or a melting together; a *fuze* is what sets off a bomb.

**Gauge** is preferred to "gage."

**GMT** Greenwich Mean Time, so-called because it is referenced to the Prime (zero) meridian at Greenwich, England. GMT is sometimes referred to as "UT," or universal time, which is announced in the Morse Code every 5 minutes by radio stations WWV (Fort Collins, CO) and WWVH (Puuene, Maui, HI) of the National Bureau of Standards. UT is also expressed as UTC (Universal Time Coordinated). GMT, UT, and UTC are all understood if expressed as "zulu" or "Z" time: e.g., 1800Z. "Greenwich Mean Time" and "zulu time" are the only terms given in *The Official Dictionary of Military Terms* (1988) compiled by the Joint Chiefs of Staff and authorized for use by the DoD.

**Helps contribute to** Redundant. "Helps" or "contributes to" is enough.

**His, her** Never presume maleness. Construct or rewrite sentences to eliminate "his/her" references. Rewrite "A scientist weighs his/her evidence carefully" as "Scientists weigh their evidence carefully."

**Hopefully** When someone says "Hopefully, we'll get to that next week," they probably mean "Wishfully, we'll get to that next week," which makes about as much grammatical sense. Change it to "We hope we'll get to that..."

**However** It's OK to start a sentence with "however," or even "but." But the important thing is to be sure the proper thoughts are contrasted.

**Ibid** Abbreviated from *ibidem*, literally "in the same place." Used in bibliographies and footnotes to avoid repeating references.

**Identical to** Wrong. It's "identical with."

**Impact** Popular as noun or verb with those who might enjoy shooting doves with atomic cannon. Unless you like your prose pockmarked with bomb craters, lighten up on the blast damage and try "affect" or "effect." And don't even think about using "impact on."

**Imply, infer** To *imply* is to signify or hint. To *infer* is to deduce. An author implies; the reader infers.

**Impractical, impracticable** If something is impractical, it is "unwise to put into practice." Although a flush handle on the inside of the toilet tank may be "impractical," it's not "impracticable" because you can install it that way if you want to.

**In a...manner** Verbose. Instead of "in an effective manner," say "effectively."

**In conjunction with** Longer, more pretentious way of saying "with," "in," or "on." Same for "in connection with."

**In depth** The term tends to add weight to light subjects. Almost automatically tacked on to "study," "report," or "analysis."

**Inflammable** is correct if you mean "likely to catch fire." *Flammable* has been substituted by those who think the "in" prefix means "*not* flammable." It doesn't, but "flammable" has become common in safety warnings and placards anyway.

**Initialism** A formation composed of the initial letters of a compound term. Unlike acronyms and abbreviations (contractions), initialisms are verbalized letter by letter, rather than as a new word or as the original word. Examples are ATC, AWS, ADPE, AFCS.

**In number, in size** Redundant to "few in number" and "small in size." Automobile dealers are fond of the expressions like "blue in color," but they pay for the ads.

**In the course of** A big hit in the Declaration of Independence, but redundant in technical writing. Say "during," "in," or "at."

**In the vicinity of** How about "near"?

**Indicate** A tiresome word-of-all-work. How about trying a substitute now and then? Just a few suggestions: hint, suggest, intimate, insinuate, imply, reveal, disclose, convey, announce, affirm, assert, specify, stipulate, insist, protest, proclaim, propose, advocate, recommend, urge, note, point out, show, signify, profess, particularize, report, admit, concede, grant, confess, testify, state, declare, remark, and say.

**Include** If you intend to list all the items in a series, do not preface that series with "includes." Wrong: "The four necessary elements include oxygen, nitrogen, hydrogen, and argon." Right: The 20 necessary elements include oxygen, nitrogen, hydrogen, and argon."

**Incomparables** Incomparables are words like "permanent," "unique," and "pregnant." They don't accept modifiers.

**Interim, in the** Try using "meanwhile" occasionally.

**Invariably** It does not mean "often or frequently." It means "always, without exception."

**It, there** Look with suspicion on any sentence that starts with "it" or "there." You'll find that many (but not all) can be improved. Examples: "It is believed by most meteorologists that..." can be rewritten as "Most meteorologists believe that...," and "There are some of us who think that..." is better as "Some of us think that...."

**It's, its** It's is the contraction for "it is" and "it has" (It's time, It's been fun). "Its" (no apostrophe) is the possessive.

**It is obvious that** A fine device for showing readers how much more you know about the subject than they do. To really impress them, toss in an occasional "obviously," "clearly," or "as everyone knows."

**kelvin** K is the symbol for kelvin. It's "287 K," not "287° K" or "287 KELVIN." And when referred to in text, it's "kelvin," (lower case) not "degrees kelvin." Example: "The temperature of the triple point of water is defined as 273.16 K."

**Keystroke, keystroking** One word--the act or instance of depressing a key on a keyboard.

**Last, latest** "Last" implies finality--"latest" implies "most recent." We hope, for example, that the breath you just took was your *latest*.

**Latter** Always used to refer to the second of two--not the third of three or anything else. Use it carefully. If the use of "latter" makes the reader back up to recheck the first thought, consider repeating the original.

**Less, fewer** "Less" answers "How much?" "Fewer" answers "How many?" Use "less" for amount, "fewer" for number (*less than a bushel, fewer than 20*).

**Like, as** Use "like" as a preposition to introduce a comparison (It looks like a train). Don't use "like" as a conjunction; instead, use "as if" or "as though" (He looked as though he would pass out).

**Literally** It means "actually." Don't mix it up with "figuratively," which is literally an opposite.

**Locate** Correctly used in the sense of "search for," or "find the location of." Redundant to "Scott AFB is located in Illinois" unless Scott AFB has been lost and you have just found it.

**Majority of** See "most."

**Mean, median, average** A *mean* is the middle point. If the high was 80°F and the low was 40, the mean is 60. The *median* is that point in a series at which half the members of the series are on one side and half on the other. If for example, five people weighed 100 pounds, 105 pounds, 110 pounds, 125 pounds, and 130 pounds, the median weight is 110 pounds. An *average* is the sum of a series divided by the number of members in the series. The average weight of the five people mentioned above is 114 pounds. When not speaking statistically, "average" can be used to mean ordinary or typical.

**Monologophobia and synonymomania** Words coined by Theodore Bernstein (The Careful Writer, Athenæum, 1967) According to Bernstein, a *monologophobe* is someone who lives in fear of using the same word twice in more than three successive lines. Closely related is the *synonymophobe*, who is compelled not to call a spade a spade, but rather a "garden implement" or "hand-held earth-rearrangement tool." Avoidance of the monotony likely to be caused by repetition is to be admired, but mechanical substitution of like terms can sometimes make a bad situation worse. Avoid "elegant variation"--the use of strained, unusual, or seldom-used synonyms.

**Monsoon Trough** Simplistically, the dividing line between the northeast and southeast trade winds. Generally preferred to "Intertropical Convergence Zone (ITCZ)." For the benefit of our British readers, explain the relationship at least the first time used. Under certain conditions, sometimes referred to as the "Equatorial Trough." Capitalize even when shortened to "the Trough."

**Most** A better way of saying "the majority of," "the vast majority of," and even "the overhelming majority of."

**Nature, of a...** Instead of "acts of a hostile nature," try "hostile acts."

**Near-record, near-miss**, etc. We know what you're trying to say here, but don't go near-overboard. There are only a few terms that will hold still while you tack on a "near-." Think it over before coining new associations.

**Necessary prerequisite** A prerequisite is something that is necessary before something else is possible. "Necessary" is ridiculously redundant.

**Non-** There are hundreds of "non" formations possible, and all should be used with caution. Remember that adding a "non" prefix to the parent word results in an expression that means, literally, everything in the universe except the parent word. This is a rather imprecise way to describe things. For example, "non-rock" is everything except rock and "Non-Air Force publications" would include every publication in the world except USAF's. There are, of course, legitimate uses for the "non" prefix. Dictionaries offer long lists of recognizable "non" words (we count six pages worth in Webster's unabridged). Our recommendation: avoid hasty coinage, check a good dictionary, and consider a rewrite to avoid using "non" in the first place.

**No one** Two words.

**Obviate** To make unnecessary. You can't, therefore, say that something has "obviated the possibility of, or the need for," something else.

**Ongoing** A traditional bureaucratic favorite. The apparent opposite of "offcoming."

**Over** "The 1986 rate was down 10 percent over 1985." If the 1986 rate went down, how come it was over the 1985 rate? Better as "The 1986 rate was 10 percent less than (or lower than) that for 1985."

**Overview** A "vogue" word, meaning "a view from a lofty perch." A buzzard has an "overview."

**Past history** More tautology. All history is past.

**Parameter** After postulating that language is in decline, Edwin Newman (Strictly Speaking, Warner Books, 1975) reinforces the premise by writing, "Others believe that if there is one word that expresses the spirit of the age, it is *parameter*, a mathematical term now widely misused so that nobody finds himself in the hateful position of having to say boundary or limit." Although everyone is guilty, meteorologists and others of a scientific and technical persuasion (most recently, the computer community) have done more than their share in beating the word to death by using it for anything from rainfall rates to raquetball scores. As a result, the real meaning has become smothered--ironically, by the very people who should be most concerned with precision in thought and expression. The real meaning of parameter, as it is most commonly used in statistics, is this: "A descriptive characteristic (such as the mean and the standard deviation) of a population. A statistic is a descriptive characteristic of a sample. In statistic inference, we make inferences about parameters from their corresponding statistics." (Statistics and Econometrics, Schaums' Outline Series, p. 66, McGraw-Hill, 1982.).

**Particular** As in "this particular computer," or "that particular office." Almost always redundant. Frequently used in speech as a pompous padding. Don't let it creep into your writing.

**Per** Don't use as a substitute for "a." Wrong: "7 days per week." Right: "7 days a week." Don't begin sentences with "per," as in "Per your instructions, we plan to ...."

**Percent** One word.

**Personnel** Used well to describe certain offices and AFSCs, but overused elsewhere. We don't make "personnel to personnel" phone calls, and it's not "We the personnel." If you *mean* people, *say* people. And when referring to men and women, don't say "male personnel" and "female personnel."

**Plan on** In most usage, omit "on" or make it "plan to," as in "He planned a smaller lab," or "We planned to test Monday."

**Possess** A flowery way of saying "Have." Good for lyric writers and exorcists--bad for technical writers.

**Preclude, prevent** Preclude means "to prevent or hinder by necessary consequence or implication." It goes well beyond the simple "prevent," which is what you probably mean.

**Prepositions, ending sentences with** Because the literal meaning suggests that a preposition be "placed before" other words, strict grammarians insist that they not be used at the end of sentences, even when they obviously belong there. When Sir Winston Churchill was criticized for such grammatical trespass, he responded that this was the sort of "pedantry up with which I will not put." You don't have to put up with it either. If it's the natural thing to do, do it.

**Presently** It means "soon," not "now."

**Presents** Stuffy when used too often for gives or provides. "This handbook gives (not presents) tips for editing technical publications."

**Preventive** Correct. "Preventative" is a malformation.

**Prime consideration** Trite. Try almost anything else.

**Prior to, previous to** "Before" is better. And unless you're getting paid by the word, "After" is better than "subsequent to."

**Process** Still more padding when tacked on other words to make a simple thought more ponderous. Examples: "the production process" (production) or "the quality control process" (quality control). See *system*.

**Processing** Through constant use, this has come to mean "doing whatever is necessary."

**Providing that** Wrong. The term is "provided that."

**Proportion** Don't use it for "big." Proportion expresses *relationship*, not size.

**Proven** The Scottish participle of prove, now archaic. Use "proved," as in, "It has been proved that man's chances for survival are measurably improved when his parachute opens before landing."

**Purpose** Used too often for padding, as in "This is here for testing purposes," or "We're here for the purpose of helping you." Make it "This is here for testing," and "We're here to help you."

**Qualifiers** Words like "very," "rather," and "quite" serve little purpose in technical writing save that of promoting ambiguity. E.B. White (Elements of Style, MacMillan, 1979) calls them "Leeches in the pond of prose, sucking the blood of words." Try to avoid the following: "a great many, a number of, largely, mainly, by and large, considerably, very, rather, more or less, reasonably, relatively, generally, to some degree, appreciably, little." To help in appreciating the degrees of ambiguity that certain qualifiers can express, consider their use when applied to the term "sure" in the following table:

not quite sure
fairly sure
rather sure
reasonably sure
**SURE**
very sure
really sure
sure indeed
damned sure

**q.v.** Latin (*quod vide*) for "which see." Inserted in text to tell readers unacquainted with a term or fact that they may find an explanation under the term or fact preceding the q.v. Sometimes simply expressed as "which see."

**Reason is...because** Wrong. Make it "The reason is that...."

**Respectfully, respectively** *Respectfully* means "with deference"; *respectively* means "each in the order given".

**Semiannual** Every 6 months. One word, no hyphen. There are some "semi" words (mostly new coinings) that do take a hyphen. Check a good dictionary to be sure.

**Situation** A redundant add-on. Popular with sports announcers and weather forecasters, as in "It looks like a passing situation, Don," and "It seems we have a thunderstorm situation tonight." Technically, the word implies "relative location" (His situation on the tower gave him a clear view).

**Split infinitive** Not necessarily bad, so long as you don't obscure the meaning by putting long phrases between "to" and the rest of the infinitive. In "The equipment had been modified to better serve the needs of the agency," the infinitive is split, but the meaning is clear. This, however, needs rewrite: "We decided to completely, and with no thought of ever changing, revise our schedules."

**Subsequent to** Substitute "after." See *prior to*.

**Suite** Literally, "a series or group of things forming a unit or collection." Until recently, its use was limited to dwellings or furniture ("hotel suite," "dining room suite"), but it is now being used (primarily in the computer community, where it seems to go well with "architecture") to mean groups of *anything*. Be careful.

**Supersede** The only English word that ends in "sede." It's also "supersession."

**System** Another redundant add-on. "System" has been tacked on to so many things lately (some wristwatches are now called "personal timekeeping systems") that it can almost be regarded as a "verbal period."

**Tautology** Needless (often ridiculous) repetition. "Future plan," "past history," "true fact," "advance preparation," and "necessary prerequisite" are examples.

**That, which** "That" is the defining, or restricting, pronoun. "Which" is nondefining and nonrestrictive. Examples: "The machine that had been in use for 3 months was moved to the back" (tells which machine was moved). "The machine, which had been in use for 3 months, was moved to the back" (adds a fact about the only machine under discussion). Note that "which" is much more commonly misused for "that" than vice-versa. As a rule of thumb, compare your thought to "the house which Jack built."

**Thrust** An invaluable word for the writer whose ideas haven't any.

**Total of** "A total of" can be used to avoid starting a sentence with a number, or to sum up after a long list of numbers. In most other applications, it's redundant.

**Toward, towards** The English say "towards." Here in the colonies, it's "toward."

**Trade wind** Two words.

**Try to, try and** "Try to" is correct.

**Type** Use "type" compounds only when the reference is highly specific or technical. For example, "A-type blood," "Z-type girder." In other applications, use *type* as a noun and follow it with "of," as in, "a peculiar type of map." Better yet, say "a peculiar map."

**Usage** Only applied to *language*, as in "Modern English Usage." In all other cases, stick to "use."

**UT** Universal Time (see GMT).

**UTC** Universal Coordinated Time (see GMT).

**Utilize** The simple things are still best, as is the case with "use" vs. "utilize." There is simply no application in which "use" will not replace the more pretentious "utilize," even though there are subtle shadings of meaning in each. One can be grateful, however, that those who lunge automatically for seven letters when three will do have not seized on the opportunity for further obfuscation. We are blessed, for example, not to have (so far) "utilized car lots" or documents with "For Official Utilization Only" stamps. But it's probably just a question of time.

**Via** Latin for "by way of." Use it only in its literal, geographic sense.

**Viz** Don't. Use "namely."

**Voice** Terse and precise technical writing requires habitual use of the active (as opposed to passive) voice. It's OK to mix voices occasionally for variety, but stick to the simple "subject-verb-object" pattern whenever possible. "He hit me," for example, is much preferred to "I was hit by him."

**Vis-a-vis** Literally, "face to face." Use it carefully.

**While** Don't use it for "although," "but," or "whereas." "Although (not while) the material will work, it won't work for long." "This one is black, whereas (or 'but,' not while) the other is grey."

**Which see** See *"q.v."*

**Widespread** One word, no hyphen.

**Word processing** Two words.

***Worldwide*** One word, no hyphen.

**Year-round** Adjective (a year-round wet season); preferred to "year-around."

**Zulu Time, Z** See GMT.

# THE NUMBERS

Most rules for numbers are based on the fact that the reader comprehends numerals more readily than numerical word expressions, particularly in scientific or technical matter. For special reasons, however, certain numbers are spelled out as indicated in the following rules summary.

## TWO BASIC RULES:

Unless it's the first word in a sentence, use *figures* for numbers of 10 or more.

| | |
|---|---|
| about 50 balloons | 24 trucks |
| nearly 40 people | 10 missiles |
| almost 20 miles | 15 times |

Except for time, money, and units of measurement, *spell out* numbers under 10.

| | |
|---|---|
| nine people | seven times |
| four hammers | three occasions |

**TIME, MONEY, AND MEASUREMENT;** Express units of *time*, *money*, and *measurement* in *figures*.

### Time:

6 hours 8 minutes 20 seconds

| | |
|---|---|
| 10 years 3 months | 1 month |
| 8 days | 24 hours |
| 1300 hours | 2359 |

*BUT:*

| | |
|---|---|
| three decades | four (calendar) quarters |
| in any one year | in a week or two |
| four afternoons | |

### Age:

| | |
|---|---|
| People under 45 | a 3-year-old building |

### Dates:

August 1986
6 August 1986
the 4th of July (the date)
The Fourth of July (the holiday)
the 1st of the month (a specific day)
the first of the month (not a specific day)

### Money:

| | |
|---|---|
| $3.50 | $3 (not $3.00) |
| 75 cents each | |

**Measurements**: (But: twofold, two-ply)

| | |
|---|---|
| 8 X 10 inches | 2,400 candlepower |
| 7 meters | 1,000 ohms |
| 9 yards | 10 miles |
| 20/20 vision | 4 tons |

## DEGREES:

Longitude 77° 04' 06" W
Latitude 49° 26' 14" N
77 04' W, 49 26' N
an angle of 45°
45°F
7°C

*BUT:*

two degrees of emphasis
12 degrees of hardness
280 K

## DECIMALS:

Omit zeros after a decimal point unless they indicate exact measurement.

removal correction 25.0 feet
station pressure 29.000 inches

In text, supply a zero before a decimal point if there is no unit (0.25 inches). Exception: .30 caliber.

## MATHEMATICAL EXPRESSIONS:

Multiply by 3
divided by 6

**PERCENTAGE:**

12 percent
12.5 percent
5 percentage points

**PROPORTION:**

1 to 4
1:10 million
1-3-5

**UNIT MODIFIERS:**

| | |
|---|---|
| 5-day week | 4-year-old building |
| 10-foot pole | 5-foot-wide door |
| 40-hour week | 5-percent increase |
| 1-inch cable | 50-percent chance |
| 2-quart can | 6-foot drop |

*BUT:*

| | |
|---|---|
| a nine-story building | a five-man team |
| a $20 million project | a six-part test |

**FRACTIONS:**

Express fractions as numerals.

| | |
|---|---|
| -inch pipe | 1-mile run |
| 3 quarts | 2 times |
| 5 points | 1/1000-inch thread |

Fractions that stand alone, or that are followed by "of a" or "of an" are spelled out.

| | |
|---|---|
| one-half | one-half of a point |
| five-eighths | one-tenth of an inch |

**NUMERAL PUNCTUATION:**

Use commas in numbers containing four or more digits, except for serial numbers, common and decimal fractions, astronomical and military time, and radio frequencies of more more than four digits.

| | |
|---|---|
| 2,400 feet | 1,500 miles |
| 1,467 items | 9,600 baud |
| 34.5 MHz | 1,500 bytes |

*BUT:*

| | |
|---|---|
| AD-A137896 | 2300 hours |
| 1/1500 | 1200 MHz |

**NUMBERS THAT ARE SPELLED OUT:**

Spell out numerals and ordinals at the beginning of a sentence or heading, or rewrite to avoid beginning with a figure.

Five years ago, not: 5 years ago

The program began in 1970; not: 1970 was the first year of the program.

Spell out numbers when they are close together at the beginning of a sentence so as to treat related numbers alike.

Ten to twenty of the experiments failed.

Fifty or sixty miles away was another.

Spell out a number of less than 100 when it precedes a compound modifier containing a figure.

two -inch boards
twenty 5-gallon cans
eighty 45-foot poles
ninety-nine 8-inch gauges

Spell out indefinite expressions or round numbers. The use of such words as *nearly, about, around,* and *approximately* does <u>not</u> constitute an "indefinite expression."

| | |
|---|---|
| a thousand reasons | a hundred items |
| 10 million dollars | fifty-odd items |

Spell out numbers with serious or dignified subjects.

The Original Thirteen States
The First Ten Amendments

When numbers larger than 1,000 are spelled out, use this form:

two thousand and twenty
one thousand two hundred and fifty

## NUMBERS THAT ARE SPELLED OUT, Cont'd:

Spell out numbers under ten that express time, money, or measurement whenever they are separated from their unit description by more than two words.

two or more successive years (but 2 or more years)

Five or any smaller number of days (but 5 or fewer days)

Do not repeat spelled out numbers as figures.

Wrong: There were eight (8) reagents used.

## ORDINAL NUMBERS:

Use figures for serial ordinal numbers, beginning with the tenth. Spell out the first through the ninth.

| | |
|---|---|
| eighth meridian | 15th meridian |
| ninth birthday | 10 birthdays |

*BUT:*

Sixth Annual Range Commanders Conference (A title)

Except when they are used at the beginning of a sentence, express military unit designations in figures. Exception: Army Corps (IX Corps).

5th Weather Wing (or 5 WW)
375th Air Base Group (or 375 ABG)
2d Infantry Division
VIII Corps
7th Army
21st Air Force

Treat ordinals and numerals in a sentence according to the rules dealing with ordinals and numerals alone or in a group.

The fourth line contained 12 errors.

The 12th line contained four errors.

# PUNCTUATION

There are literally thousands of rules for punctuating the English language. Most are based on practicality and common sense, and others are founded either on the convention of standardization or typesetting requirements. Nearly all have reader convenience in mind. What follows is a brief summary of the more general rules for punctuation. Consult the current US Government Printing Office Style Guide for a complete rules listing.

## USE AN APOSTROPHE:

To form the possessive of a singular or plural noun.

| | |
|---|---|
| airman's | airmen's |
| woman's | women's |
| unit's | units' |
| Corps' | Mars' |

In possessive indefinite or impersonal pronouns.

| | |
|---|---|
| each other's problems | one's own home |
| someone's pencil | someone else's idea |

In such general terms as these:

| | |
|---|---|
| a moment's notice | at arm's length |
| author's comments | writer's cramp |
| traveler's checks | a week's work |

To indicate contractions, the omission of letters, and the coined plurals of letters, figures, and symbols.

don't can't wasn't shouldn't
49'ers O.K.'s ABC's 45's
$'s &'s a's, b's X's, Y's
2 by 4's (lumber) 8 by 10's (photos)
the 1970's (or the seventies--not the '70s nor 70's)

To form the past tense indicative and the past participle of verbs formed from other parts of speech.

| | |
|---|---|
| QC'ed | IG'ed |

For euphony (pleasant sound), nouns ending in "s" or "ce" and followed by a word beginning with "s" are made possessive by adding an apostrophe only.

for goodness' sake
for old times' sake
for conscience' sake

In compound nouns, add the apostrophe "s" to the element nearest the object possessed.

Inspector General's report
Comptroller General's decision

## DO NOT USE AN APOSTROPHE:

After names of countries or other organized bodies ending in "s" or after words more descriptive than possessive unless the plural does not end in "s."

| | |
|---|---|
| Users Handbook | Teachers college |
| United States control | Inspectors Manual |
| United Nations Meeting | |

*BUT:*

men's room
women's magazines
children's hospital

With possessive pronouns (its, theirs, ours).

To form the plural of spelled-out numbers, or words referred to as words unless the omission of the apostrophe would cause difficulty in reading.

| | |
|---|---|
| twos | ins and outs |
| do's and don'ts | threes |
| ups and downs | sevens |
| yeses and noes | which's and that's |

In abbreviations, nor in the shortened forms of certain words.

| | |
|---|---|
| Sgt | Halloween |
| possum | Capt |
| phone | copter |

**USE BRACKETS [ ]:**

To enclose interpolations not specifically a part of an original quotation, or to enclose corrections, explanations, editorial comments, or a caution that a mistake had been repeated verbatim.

The flutter valve [pictured in Appendix A] was no longer functional.

The team leader [Robinson] concluded the experiment.

We were appraised [sic] of the change too late to do anything about it.

**USE A COLON:**

Before a final clause that extends or amplifies preceding matter.

Two things are essential: ambition and hard work.

Save water: Shower with a friend.

To introduce formally any matter that forms a complete sentence, question, or quotation.

This question was raised: Where will the money come from?

The chairman said: "This meeting is adjourned."

There are three reasons for my decision: The first is obvious.

Always place a colon outside quotation marks.

Don't say "at this time": Say "now."

As a general rule, capitalize the first word following a colon when it begins a complete statement. Use a small letter when the colon introduces a subordinate element or elements.

You know the answer: It will not please you.

There are two sections: first class and second class.

Always use two spaces after a colon.

**USE A COMMA:**

To separate two words or figures that might otherwise be misunderstood.

Instead of hundreds, thousands appeared.

Instead of 20, 50 arrived.

In 1986, 50 storms developed.

Before a direct quotation of only a few words following an introductory phrase.

He said, "Now or never."

To indicate the omission of a word or words.

In the past, there were many volunteers; now, none.

In 1885, there were 187 cases; so far in 1986, only 43.

After each in a series of coordinate qualifying adjectives.

a neat, clean, well-organized laboratory.

an aggressive, experienced commander.

Between an introductory modifying phrase and the subject being modified.

Discouraged by failure, they discontinued the project.

Flushed with victory, they celebrated with champagne.

Before the conjunction (and, but, or, nor, for) in a compound sentence with an independent clause. Note: Some texts approve of omitting the comma if the clauses are short. But this leads to still another exception to an already confusing business, and frequently leads to the omission of a comma where one belongs. It's a good general rule to at least consider a comma to separate all independent clauses. If in doubt, read the sentence aloud. If there's a vocal pause at the place in question, use a comma.

Although the data was available, it was usually ignored.

The system was logged out, but still used.

**USE A COMMA:**

To set off parenthetic (nonrestrictive) words, phrases, or clauses. Do not set off restrictive words, phrases, or clauses.

Major Smith, the team leader, is rated. (nonrestrictive--adds an additional fact about Major Smith)

Major Smith the team leader is rated. (restrictive--identifies this Major Smith as the one who is the team leader)

Observers, who are required to operate tactical equipment, are qualified to take part in maneuvers. (nonrestrictive--simply adds a fact about all observers)

Observers who are required to operate tactical equipment are qualified to take part in maneuvers. (restrictive--says that only observers "who are required to operate tactical equipment" are "qualified to take part in maneuvers")

To set off words or phrases in apposition or contrast.

Major Smith, rather than the team leader, led the discussion.

The Z-100, not the Z-248, was the initial selection.

After each member in a series of three or more words, phrases, or figures used with "and," "or," or "nor."

red, white, and blue
one, two, three, and four
cats, rats, or mice
neither rain, nor snow, nor dark of...
2 days, 3 hours, and 4 minutes (a series)
BUT: 2 days 3 hours 4 minutes (an age)

Between the title and name of an organization in the absence of "of" or "of the."

Commander, USAFETAC
Chief, Environmental Applications Section

Inside a closing quotation mark.

Items marked "A," "B," and "C," were left.

"Everything will be destroyed," he told us.

To separate thousands, millions, etc., in numbers with four or more digits. There are exceptions; see "The Numbers."

2,400 55,260
1,000,000

To set off items in addresses, geographical names, and unit designations, except for ZIP codes.

55 Post Drive, Tulsa, Oklahoma 23789.

Drop by the shop in Paris, Illinois, while you're there.

Operating Location A, USAFETAC

To set off parenthetical explanations, transitions, and afterthoughts.

Inside, there was chaos.

However, the experiment continued.

The experiment continued, however.

Detachments, unlike squadrons, are exempt from the requirement.

Airmen may, if they wish, take the test again.

To set off phrases with a common termination.

It is the best, if not the only, manual on the subject.

He was a liberal, perhaps ultra-liberal, republican.

**DO NOT USE A COMMA:** (All examples are of *incorrect* usage)

To separate a single or final adjective from its noun.

An aggressive, experienced, commander.

To separate a subject from its verb unless there are intervening words that require punctuation.

The value of a program, is known by its output.

**DO NOT USE A COMMA:** (All examples are of *incorrect* usage.)

To separate a verb from its complement unless there are intervening words that require punctuation.

The section chief made safety, a special emphasis topic.

To separate two words or phrases joined by a coordinating conjunction (except to produce a stylistic effect).

The airplane was exceptionally fast, and fuel-efficient.

To separate an introductory word, phrase, or short clause from the main body of a sentence (except when necessary to prevent misreading).

Wednesday, the ice started to break up.

To separate a restrictive modifier from the main body of a sentence.

The car, that had fallen through the ice, was winched back to shore.

Before ZIP codes.

NOT Scott AFB, IL, 62225-5438

**USE THE ELLIPSIS:** (Three evenly spaced periods)

To indicate an intentional omission of words from quoted or referenced material.

The rule says that "In case of power outage...the operator will turn off all equipment and...call maintenance."

When the ellipsis falls at the end of a sentence, use four periods.

The rule requires that the operator disconnect external power and....

**USE THE EM DASH**: (in typed copy, two hyphens, no spaces)

To mark a sudden break or abrupt change in thought.

He asserted--and no one contradicted him--that it was time wasted.

Instead of commas and parentheses when the use of the em dash would improve the meaning.

There are benefits--saved time and a better finish--but the cost is outrageous.

Before a final clause that summarizes a series of ideas.

Economy of time, motion, and effort--these are the cornerstones of efficiency.

**USE THE EN DASH**: (In typed copy, one hyphen)

In word compounding or in end-of-line word division (which see).

*In the absence of the word "to" when denoting a period* of time.

| | |
|---|---|
| 1985-86 | June-January |
| Monday-Friday | 0800-1600 |

To avoid ambiguity or prevent mispronunciation.

multi-ply (several plies)
pre-position (place before)
re-cover (cover again)
un-ionized

**DO NOT USE THE EN DASH** for "and" or "to" when the words "between" or "from" precede an expression denoting a period of time.

between 0800 and 1600--NOT between 0800-1600
from 0800 to 1600--NOT from 0800-1600

## USE PARENTHESES:

To set off matter not intended as part of the main statement or not an element of the sentence, but that is important enough for inclusion.

The use of the comma (see rule 2) is a bit tricky.

A lot of customers (about 50) have already complained.

To enclose a nonrestrictive clause when the intended pause is too great to be indicated by commas.

When the rest of the people see this (and you know they will) they'll be lined up for blocks.

Before mixing the reagents (but not before separating the agents) close both taps.

To enclose letters or numbers designating items in a series, either at the beginning of paragraphs or within paragraphs.

Paragraph 2a(1)(b)

You'll note that his fist is (1) large, (2) well-developed, and (3) aimed at us.

Place parenthetical expressions before the period at the end of a sentence, except when the expression is a complete sentence.

Conserve power by trimming output (except between 0800 and 0900).

There should always be at least one backup. (See OSHA Handbooks.)

## USE A PERIOD:

To end a sentence.

He was a skilled leader.

Turn off the bubble machine.

In certain abbreviations.

i.e. e.g. etc.

After an ellipsis at the end of a sentence.

The sign tells operators to "Wear safety glasses when using grinders or when...."

Always place the period inside a closing quotation mark.

The answer was "No."

When a sentence ends with an abbreviation, use only one period.

The store sells books, records, magazines, etc.

## USE THE QUOTATION MARK:

To enclose direct quotations, but not indirect quotations.

And the drunk said, "In that case, I must have squeezed your canary into my drink."

He said that he had checked, but couldn't find it.

To enclose matter following such terms as "entitled, the word, the term, marked, designated, classified, named, endorsed," or "signed," but not to enclose expressions following the terms "known as, called, so-called," etc., unless such expressions are misnomers or slang.

The word "parameter" is so misused as to be useless.

The envelope was marked "For the Commander's Eyes Only."

The document was classified "secret."

It was called profit and loss.

We rode on that so-called "airline."

To enclose titles of speeches, articles, books, captions, chapter and part headings, editorials, essays, headings, headlines, hearings, motion pictures (including TV and radio programs), papers, short poems, reports, songs, studies, subheadings, subjects, and themes, but NOT works of art or the names of newspapers or magazines.

Most of these rules are from the "United States Government Printing Office Style Manual."

We quote excerpts from his speech, "Vorticity: How to Understand it and How To Spell it."

## USE THE QUOTATION MARK:

At the beginning of each paragraph of a quotation, but at the end of the last paragraph only.

To lend emphasis to a word or phrase; but to insure emphasis, use the device sparingly.

To enclose misnomers, slang expressions, or ordinary words used arbitrarily.

> Because "catalog" is on the prohibited list, call it a "listing."
>
> Forecast "busts" were seldom identified.
>
> We watched as our "professional driver" ran off the road.

Always place commas and final periods inside quotation marks.

## USE A SEMICOLON:

To separate main (independent) clauses not joined by a coordinating conjunction.

> Rules of thumb are not axiomatic; they represent only possibilities.
>
> These databases are far from complete; there are thousands of files remaining to be entered.

To separate main (independent) clauses joined by a conjunctive adverb (however, nevertheless, moreover, therefore, consequently, hence, indeed, likewise, furthermore, namely, still, then, etc.).

> The library was officially open: however, many of the materials had not been delivered.
>
> There was no quality control of any kind; moreover, no one knew there was a requirement to establish one.
>
> The files are not on station; therefore, we stop right here.

To separate items in a series if the items themselves contain commas.

> Here are the assignments: Number 5, Smith; Number 7, Jones; and Number 10, Brown.

To set off explanatory abbreviations or words that summarize or explain preceding matter.

> Use the right tools; e.g., a fork, a pipe cleaner, and a snorkel.
>
> Written instructions should be complete; i.e., they should tell the workers everything they need to know.

To separate independent clauses joined by a coordinating conjunction, especially if you've already used commas in the clauses (optional).

> "Pappy" Boyington, a marine's marine, was one of the most colorful figures of the war; but many feel that Dick Bong was the better pilot.

In place of a comma to separate long coordinated clauses or to indicate a stronger pause between clauses (optional).

> We aren't all qualified to be generals; we aren't all prepared to be great leaders, organizers, or managers; but we are all expected to fill our own particular niches.

Always place the semicolon outside of quotation marks.

> Be careful with any container labeled "inflammable"; the stuff inside usually is.

In typed copy, use two spaces after a semicolon.

## COMPOUND WORDS

Compounding is an extremely tricky business to which the Government Printing Office "Style Manual" devotes considerable time and space. All we can do here is offer a few general rules that may save you multiple trips to the dictionary or the "Style Manual" itself.

Use a hyphen between two or more words that form a unit modifier and immediately precede the word modified.

| | |
|---|---|
| up-to-date plan | long-needed work |
| well-planned project | first-rate job |
| well-established idea | pilot-reported haze |
| many-sided argument | light-struck film |
| better-than-average day | snow-age analysis |
| Army-owned equipment | open-minded |

Although compounds like these are hyphenated when they immediately precede the word they modify, they should be written as two separate words when they follow the modified word. For example, "The program was well planned." As a general rule, use hyphens when comprehension of your intended meaning will be improved.

Do not hyphenate a compound formed from an adverb ending in "ly" and a verb.

highly polished glass
eagerly awaited moment
wholly owned subsidiary
unusually well preserved specimen

Do not hyphenate a three-word compound of which the first two are adverbs.

very well defined usage
very well worth reading
longer than usual lunch period
not too distant future

Do not hyphenate compounds when the first element is a comparative or a superlative

higher level decision
better paying job
most used facilities
larger sized quarters

Express combination color terms as separate words, but use a hyphen when they are used as unit modifiers.

bluish green, BUT bluish-green water

Treat words ending in "like" as one word, but use a hyphen to avoid doubling vowels, tripling consonant, or when the first element is a proper name.

| | |
|---|---|
| lifelike | bell-like |
| ladylike | pre-empt |
| Lincoln-like | |

Use a hyphen or hyphens to avoid ambiguity.

anti-hog-cholera serum
non-civil-service position
non-tumor-bearing tissue
re-covered

# SYLLABICATION

Syllabication is just another way of saying "end of line word division." Your best friend here is the Government Printing Office vest pocket handbook called "Word Division." The eighth edition, March 1984, should be available among the office supplies in your local supply store. The handbook provides more than 200 pages of examples, along with a comprehensive set of rules. In case you're caught without it, here are a few examples of those rules.

Divide according to pronunciation, and so that the part of the word left on the first line will at least suggest the entire word.

capac-ity, not capa-city
Wednes-day, not Wed-nesday

Don't divide on a single letter.

usu-al-ly, not u-su-al-ly

Avoid dividing short (five or fewer letters) words.

When there's a choice, divide on a vowel.

| | |
|---|---|
| particu-lar | ordi-nary |
| sepa-rate | meteoro-logy |

Divide on short prefixes; try not to divide prefixes of more than one syllable.

| | |
|---|---|
| pre-fixes | non-essential |
| pro-claim | infra-red |

Divide between double consonants (clas-sic) unless they come at the simple form of the word (call-ing).

# BIBLIOGRAPHY


## DoD PUBLICATIONS.

DoD Directive 3200.12, *DoD Scientific and Technical Information Program*, 15 February 1983 (See AFR 83-1).

DoD Directive 5230.18, *The DoD Foreign Disclosure and Technical Information System*, 6 November 1984.

DoD Directive 5230.24, *Distribution Statements on Technical Documents*, 20 November 1984 (See AFR 80-45).

DoD Directive 5230.25, *Withholding of Unclassified Data from Public Disclosure*, 6 November 1984 (See AFR 80-34).

*Abstracting Scientific and Technical Reports of Defense-Sponsored RDT&E*, Defense Documentation Center, Cameron Station, Alexandria, VA, March 1968 (AD-667000).

## USAF PUBLICATIONS.

AFR 5-14, *Documents and Publications for Air University Library (AUL)*, 22 March 1979.

AFR 6-1, *Policies, Procedures, and Standards for Production and Procurement of Air Force Printing, Duplicating, Copying, and Printing*, 1 June 1981.

AFP 80-30, *Marking Documents with Export-Control and Distribution-Limitation Statements*, 20 December 1985.

AFR 80-34, *Withholding of Unclassified Technical Data from Public Disclosure*, 5 December 1985.

AFR 80-45, *Distribution Statements on Technical Documents*, 23 September 1985.

AFR 83-1, *USAF Scientific and Technical Information Program*, 1 December 1988.

AFR 83-2, *Air Force Technical Publications Program*, 15 June 1989.

AFR 110-8, *Inventions, Patents, Copyrights and Trademarks*, 28 July 1978.

AFR 190-1, *Public Affairs Policies and Procedures*, March 1989.

## AWS PUBLICATIONS.

AWSR 7-1, *Distribution of AWS Technical and Selected Non-Air Force Publications*, 4 August 1988.

AWSR 83-2, *Presentations and Technical Publications* (Scheduled for publication in early 1990 to supersede AWSR 80-2, November 1988).

**STANDARDS.**

ANSI/NMA MS5, *Microfiche of Documents*, National Micrographics Association, Silver Spring, MD, 1975.

ASTM 380, *Standard for Metric Practice*, American Society for Testing and Materials, Philadelphia, 1982.

Y1.1-1972, *Abbreviations for use on Drawings and in Text*, American Society of Mechanical Engineers, New York.

Y10.1-1972, *Glossary of Terms Concerning Letter Symbols*, American Society of Mechanical Engineers, New York.

Y10.4-1982, *Letter Symbols for Heat and Thermodynamics*, American Society of Mechanical Engineers, New York.

Y10.10-1953 (Reaffirmed 1973), *Letter Symbols for Meteorology*, American Society of Mechanical Engineers, New York.

Y10.17-1961 (Reaffirmed 1973), *Guide for Selecting Greek Letters Used as Letter Symbols for Engineering Mathematics*, American Society of Mechanical Engineers, New York.

Y10.20-1975, *Mathematical Signs and Symbols for Use in Physical Sciences and Technology*, American Society of Mechanical Engineers, New York.

Y15.1M-1979, *Illustrations for Publication and Projection*, American Society of Mechanical Engineers, New York.

Z39.14-1979, *Writing Abstracts*, American National Standards Institute, Inc., New York.

Z39.16-1979, *Preparation of Scientific Papers for Written or Oral Presentation*, American National Standards Institute, Inc., New York.

Z39.18-1987, Scientific and Technical Reports--Organization, Preparation, and Production, American National Standards Institute, Inc., New York.

Z39.23-1983, *Technical Report Number--Format and Creation*, American National Standards Institute, Inc., New York (Note: In revision as of late 1989).

NOTE: Complete lists of AMSE and ANSI publications are available by writing:

American Society of Mechanical Engineers
345 East 47th Street
New York, NY 10017

American National Standards Institute, Inc.
1430 Broadway
New York, NY 10018

## DICTIONARIES.


Morris, William, (Ed.), *The American Heritage Dictionary of the English Language*, 2d ed., Boston, Houghton-Mifflin, 1982.

*Webster's Ninth New Collegiate Dictionary*, Merriam-Webster, Springfield, MA, 1985.

*Webster's Third New International Dictionary of the English Language*, Unabridged, Merriam-Webster, Springfield, MA, 1981.


## SPECIALIZED DICTIONARIES/GLOSSARIES.


Baker, B.B. Jr., W.R. Deebel, and R.D. Geisenderfer, Eds., *Glossary of Oceanographic Terms*, 2d ed., U.S. Navy Oceanographic Office, Washington, DC, 1966.

Compilation of ASTM *Standard Definitions*, 5th ed., American Society for Testing and Materials, Philadelphia, 1982.

Considine, Douglas M. (Ed.), *Van Nostrand's Scientific Encyclopedia*, 6th ed., Van Nostrand Reinhold, New York, 1984.

Edmunds, Robert A., *The Prentice-Hall Standard Glossary of Computer Terminology*, Prentice-Hall, Englewood Cliffs, NJ, 1985.

James, Glenn, and Robert C. James, *Mathematics Dictionary*, 4th ed., Van Nostrand Reinhold, New York, 1976.

Horn, George M. (Ed.), *Glossary of AWS ACRINABs (Acronyms, Initialisms, and Abbreviations Commonly Used in Air Weather Service)*, USAF Environmental Technical Applications Center, Scott AFB IL, 1989.

Huschke, Ralph E. (Ed.), *Glossary of Meteorology*, American Meteorological Society, Boston, MA, 1959.

Munro, David (Ed.), *Chambers World Gazetteer*, Chambers/Cambridge, 1988.

Parker, Sybil P. (Ed.), *McGraw-Hill Dictionary of Scientific and Technical Terms*, 4th ed., McGraw-Hill, New York, 1989.

Pedde, Lawrence D., et al., *Metric Manual*, GPO S/N, 024-003-00129-5, U.S. Government Printing Office, Washington, DC, 1978.

Sippl, Charles J., *Computer Dictionary and Handbook*, 4th ed., Howard W. Sams Co., Indianapolis, IN, 1985.

Walker, Peter M.B. (Ed.), *Chambers Scientific and Technology Dictionary*, Chambers/Cambridge, 1988.

*Webster's New Geographical Dictionary*, G. & C. Merriam Co., Springfield, MA, 1977.

Weik, Martin H., *Standard Dictionary of Computers and Information Processing*, revised 2d ed., Hayden Book Co., Inc., New York, 1977.

## ENGLISH USAGE TEXTS, GRAMMARS, STYLE GUIDES.


Angione, Howard, Ed., *The Associated Press Stylebook and Libel Manual*, The Associated Press, New York, 1977.

Barzun, Jacques, *Simple and Direct: A Rhetoric for Writers*, Harper and Row, New York, 1985.

Bernstein, Theodore M., *The Careful Writer: A Modern Guide to English Usage*, Atheneum, New York, 1965.

Bernstein, Theodore M., *Miss Thistlebottom's Hobgoblins: The Careful Writer's Guide to the Taboos, Bugbears, and Outmoded Rules of English Usage*, Simon and Schuster, New York, 1984.

Bernstein, Theodore M., *Watch Your Language*, Pocket Books, Inc., New York, 1958.

Ebbitt, Wilma R., and David R. Ebbitt, *Writer's Guide and Index to English*, 7th ed., Scott Foresman, Glenview, IL, 1982.

Flesch, Rudolf, *The Art of Plain Talk*, Collier Books, London, 1951.

Flesch, Rudolf, *The Art of Readable Writing*, Collier Books, New York, 1949.

Follett, Wilson, Modern *American Usage: A Guide*, Edited/completed by Jacques Barzun and Others, Avenel Books, New York, 1980.

Fowler, H. Ramsey, et al., *The Little, Brown Handbook*, 2d ed., Boston, 1983.

Fowler, H.W., *A Dictionary of Modern English Usage*, 2d ed., revised by Sir Ernest Gowers, Greenwich House, New York, 1983.

Gowers, Ernest, *The Complete Plain Words*, Penguin Books, Baltimore, 1975.

Hodges, John C., and Mary E. Whitten, *Harbrace College Handbook*, 9th ed., Harcourt Brace Jovanovich, New York, 1982.

Mager, Nathan H., and Sylvia K. Mager, *Encyclopedic Dictionary of English Usage*, Prentice-Hall, Englewood Cliffs, NJ, 1974.

McCrimmon, James M., *Writing With a Purpose*, 8th ed., Houghton Mifflin, Boston, 1984.

Morris, William, and Mary Morris, *Harper Dictionary of Contemporary Usage*, 2d ed., Harper and Row, New York, 1985.

Newman, Edwin, *Strictly Speaking*, Warner Books, New York, 1974.

Newman, Edwin, *A Civil Tongue*, Warner Books, New York, 1975.

Skillin, Marjorie E., Robert M. Gay, and others, *Words into Type*, 3rd ed., Prentice-Hall, Englewood Cliffs, NJ, 1974.

Strunk, William Jr., and E.B. White, *The Elements of Style*, 3rd ed., MacMillan, New York, 1979.

*Style Manual*, rev. ed., GPO S/N 2100-0068, U.S. Government Printing Office, Washington, DC, 1984.

## TECHNICAL WRITING/EDITING/PUBLISHING GUIDES.


Alvarez, Joseph A., *The Elements of Technical Writing*, Harcourt Brace Jovanovich, New York, 1980.

Andrews, Deborah C., and Margaret D. Blickle, *Technical Writing: Principles and Forms*, 2d ed., MacMillan, New York, 1982.

Barnett, Marva T., *Writing for Technicians*, rev. ed., Delmar Pubs Inc., Albany, NY, 1982.

Barrass, R., *Scientists Must Write: A Guide to Better Writing for Scientists, Engineers, and Students*, Methuen Inc., New York, 1978.

Bishop, Claude T., *How to Edit a Scientific Journal*, ISI Press, Philadelphia, 1986.

Bingham, Earl, *Pocketbook for Technical and Professional Writers*, Wadsworth Publishing Corp., Belmont, Ca, 1981.

Bjelland, Harvey, *Technical Writing: The Easy Way*, Norway Books, Sparks, NV, 1981.

Brusaw, Charles T., Gerald C. Alred, and Walter E. Oliu, *Handbook of Technical Writing*, 2d ed., St. Martin's Press, New York, 1982.

Campbell, William G., Stephen V. Ballou, and Carol Slade, *Form and Style: Theses, Reports, Term Papers*, 6th ed., Houghton-Mifflin, Boston, 1982.

*The Chicago Manual of Style: For Authors, Editors, and Copywriters*, 13th ed., University of Chicago Press, Chicago, 1982.

Clements, Wallace, and Robert Berlo, *The Scientific Report: A Guide for Authors*, Society for Technical Communication, Washington, DC, 1984.

Day, Robert A., *How to Write and Publish a Scientific Paper*, 2d ed., ISI Press, Philadelphia, 1983.

Dodds, Robert H., *Writing for Technical and Business Magazines*, Krieger Publishing Co., Melbourne, FL, 1982.

*Effective Revenue Writing 1*, GPO S/N 048-004-00036-9, Internal Revenue Service, U.S. Government Printing Office, Washington, 1969 (reprinted 1980).

*Effect Revenue Writing 2*, GPO S/N 048-004-00037-7, Internal Revenue Service, U.S. Government Printing Office, Washington, 1978.

Evans, John, *Beginner's Guide to Technical Writing*, Focal Press, Stoneham, MA, 1983.

Houp, Kenneth W., and Thomas E. Pearsall, *Reporting Technical Information*, 5th ed., MacMillan, New York, 1984.

Katzoff, S., *Clarity in Technical Reporting*, (NASA SP-7010), Washington, DC, 1964.

King, Lester S., *Why Not Say it Clearly: A Guide to Scientific Writing*, Little, Brown, Boston, 1978.

Lannon, John M., *Technical Writing*, 3rd ed., Little, Brown, Boston, 1985.

## TECHNICAL WRITING/EDITING/PUBLISHING GUIDES, Cont'd.


"Manual for Authors of Mathematical Papers," *Bulletin of the American Mathematical Society*, Vol 68, No 5, September 1962.

Mathes, John C., and Dwight W. Stevenson, *Designing Technical Reports: Writing for Audiences in Organizations*, Bobbs-Merrill, Indianapolis, 1976.

McCartney, Eugene S., *Recurring Maladies in Scholarly Writing*, Gordian Press, Staten Island, NY, 1969 reprint of 1953 ed.

Mills, Gordon H., and John A. Walter, *Technical Writing*, 4th ed., Holt, Rinehart, and Winston, New York, 1978.

Monroe, Judson, *Effective Research and Writing in Government*, McGraw-Hill, New York, 1980.

O'Connor, Maeve, *How to Copyedit Scientific Books and Journals*, ISI Press, Philadelphia, 1986.

Olsen, Leslie A., and Thomas N. Huckin, *Principles of Communication for Science and Technology*, McGraw-Hill, New York, 1983.

Rock, Fern, *Slaying the English Jargon*, Society for Technical Communication, Washington, DC, 1983.

Schmidt, Steven, *Creating the Technical Report*, Prentice-Hall, Englewood Cliffs, NJ, 1983.

Sherman, Theodore A., and Simon S. Johnson, *Modern Technical Writing*, 4th ed., Prentice-Hall, Englewood Cliffs, NJ, 1983.

Sides, Charles H., *How to Write Papers and Reports About Computer Technology*, ISI Press, Philadelphia, 1986.

Smock, Winston, *Technical Writing for Beginners*, Prentice-Hall, Englewood Cliffs, NJ, 1984.

Swanson, Ellen, *Mathematics into Type: Copyediting and Proofreading of Mathematics for Editorial Assistants and Authors*, rev. ed., American Mathematical Society, Providence, RI, 1979.

*Teaching Technical Writing and Editing: In House Programs That Work*, Vol 5 (Anthology), Society for Technical Communication, Washington, DC, 1976.

*Technical Editing: Principles and Practices*, Vol 4 (Anthology), Society for Technical Communication, Washington, DC, 1975.

Testa, Don L., *How to Develop a Format for Any Publication*, Society for Technical Communication, Washington, DC, 1978.

Turabian, Kate L., *A Manual for Writers of Term Papers, Theses, and Dissertations*, 4th ed., University of Chicago Press, Chicago, 1973.

Weisman, Herman M., *Basic Technical Writing*, 5th ed., Charles E. Merrill, Columbus, OH, 1985.

Weiss; Edmond H., *The Writing System for Engineers and Scientists*, Prentice-Hall, Englewood Cliffs, NJ, 1982.

Wischerth, G.E., *Interim Standards: Technical Manuals and Report Formats*, Society for Technical Communication, Washington, DC, 1981.

## GRAPHICS, TYPESETTING, AND PASTEUP GUIDES.


Arnold, Edmund C., *Arnold's Ancient Axioms: Typography for Publications Editors*, Ragan Report Press, Chicago, 1978.

Cardamone, Tom, *Chart and Graph Preparation Skills*, Van Nostrand Reinhold, New York, 1981.

Craig, James, *Designing With Type: A Basic Course in Typography*, Watson-Guptill Publications, New York, 1980.

Craig, James, *Production for the Graphic Designer*, Watson-Guptill Publications, New York, 1974.

Field, Ron M., *A Guide to Micropublishing*, Society for Technical Communication, Washington, DC, 1975.

Graham, Walter B., *Complete Guide to Pasteup* (Third Ed.), Walter B. Graham, Omaha, Nebraska, 1987.

Gray, Bill, *Studio Tips for Artists and Graphic Designers*, Van Nostrand Reinhold, New York, 1976.

Holmes, Nigel, *Designer's Guide to Creating Charts and Diagrams*, Watson-Guptill Publications, New York, 1984.

Hurlburt, Allen, *Publication Design: A Guide to Page Layout, Typography, Format, and Style*, Van Nostrand Reinhold, New York, 1976.

Latimer, Henry C., *Preparing Art and Camera Copy for Printing*, McGraw-Hill, New York, 1977.

*Pocket Pal: A Graphic Arts Production Handbook*, International Paper Company, New York, 1983.

Sanders, Norman, and William Bevington, *Graphic Designer's Production Handbook*, Hastings Books, Ardmore, PA, 1982.

Seybold, John W., *The World of Digital Typesetting*, Seybold Publications, Media, PA, 1984.

Silver, Gerald A., *Modern Graphic Arts Paste-up*, 2d ed., Van Nostrand Reinhold, New York, 1983.

Van Uchelen, Rod, *Paste-up: Production Techniques and New Applications*, Van Nostrand Reinhold, New York, 1976.

White, Jan V., *Graphic Design for the Computer Age--The Manual for Traditional and Desktop Publishing*, Watson-Guptill Publications, New York, 1988.

**MISCELLANEOUS.**


Borko, Harold, and Charles Bernier, *Indexing Concepts and Methods*, Academic Press, New York, 1978.

Cremmins, Edward T., *The Art of Abstracting*, ISI Press, Philadelphia, 1982.

*Information Please Almanac; Atlas and Yearbook*, Houghton Mifflin, New York.

Latman, Alan, *The Copyright Law: Howell's Copyright Law Revised and the 1976 Act*, Bureau of National Affairs, Washington, DC, 1979.

Myers, Patti, *Publishing with CD-ROM, A Guide to Compact Disc Optical Storage Technologies for Providers of Publishing Services*, Meckler Publishing Corp., 1986.

*Roget's International Thesaurus*, 4th ed., revised by Robert L. Chapman, Harper and Row, New York, 1984.

Sitarz, Daniel, *The Desktop Publisher's Legal Handbook*, Nova Publishing Co., Carbondale, IL, 1989.

Strong, William S., *The Copyright Book: A Practical Guide*, 2d ed M.I.T. Press, Cambridge, MA, 1984.

*Typing Guide for Mathematical Expressions*, Society for Technical Communication, Washington, DC, 1976.

*World Almanac and Book of Facts*, Pharos Books, New York.

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